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Introductory Lectures

Lecture 1st

Definition Origin &c of Anatomy.

Anatomy in Greek Language signifies Cutting &. was confined merely to the act of dissecting by the antients; the Moderns use it in a more compound Sense

It is divided into human & Comparative tho the latter is to be introduced only, where the Parts tend to illustrate those of the human Body— Brutes are also usefull in anotomical enquiries as the frequently serve to throw some new light on the works of Nature— Anatomy has been applied to the Vegetable & Mineral Kingdom & from thence many curious observations have been collected.

This Seience has undergone many revolutions, & tho its rise was probably very early, yet its Progress was very Slow. It cannot be said to have any precise Beginning nor was it brought to Light by Chance, by the genius or Sagacity of any particular Man

— The

The first Man that lived must have had some Knowledge of the human Parts which gradually improved

The Intercourse of the Sexes, curing wounds in Short self love & Preservation continually add, something to the small Stock of Anatomical Learning

Many Parts of the Human & Brute Bodies bear a great Resemblance to each other & the Priests & Butchers, but more especially the Philosopher must be supposed to be well acquainted with the internal viscera, for the Practice of Sacrificing and feeding on Animal Food was very early.

Hippocrates distinguishes Physic & Philosophy into two distinct Professions, & was the first who wrote any Treatise on the Subject of Anatomy

The Knowledge of the Antients has been very much extolld by some who seemed to swallow every thing that was said by them with avidity: but this seems to proceed from prejudice having been conversant with their works, or from a design to destroy the works & discoveries of the moderns

All

All the accounts of Anatomy by Hippocrates, are very imperfect, if we except the Bones, And as he says he Once saw a human Skeleton, we may very readily suppose, that he was better acquainted with Osteology than any other part of the Science. — He lived 460 years before Chr.t was born in the City of ——————

And Galen the Great Commentator on his work flourished about the 190th. Year of the Christian Era. —

Between Hippocrates & Galen Hieophilus Erasistratus deserve great Praises for their improvements in Anatomy. — They Taught this Science in the great and famous School of Alexandria & Hierophilus himself is said to have dissected 700 human Bodies, he likewise opened living Bodies of Criminals, which tho it was a cruel Practice, yet is not Altogether to be praised, nor discommended, for it at least shows how anxious, he was after new discoveries. But as this Barbarity could not but be very Shocking, so it was a great disadvantage to Anatomy

&

and was a means of bringing the Science into dispute. — Galen applied himself diligently to anatomy, & Studied at Alexandria, wher he found a very good System.

Anatomy was daily advancing till it met with a Great check, at the division of the Roman Empire, & about the fifth Century all over Europe. In 1640 the Saracens made themselves masters of Alexandria & burnt the famous Library a Catastrophe which can never be enough Regretted.

But the Caliphs at Last being satiated with Conquest gave encouragement to Learning. — The Liberal Arts & the School of Alexandria were again revived.

The Arabs dissected but Little & contented themselves with Translating and Commenting on the works of the Others, but chiefly those of Galen. — This great Man was born in the City of Pergamus flourish'd at Rome during the Latter Part of the second Age of Christianity.

For

In 711. Anatomy was introduced into Spain and Learning then became or began to be distinguish'd, But in 1463 the Turks sacked Constantinople & used the same Barbarities there as had been put in Practice by the savage Arabs at Alexandria. — This event which was thought would have put a final period to Learning was the unexpected Means of extending it, for the greeks fled into Italy, with their Manuscripts, and there erected Schools from thence Learning was generally diffused through the western Parts of Europe.

Soon after Printing was invented in Italy Benedictus amasa. & Josephus, Carpensis made some discoveries in anatomy ~~Bytheir~~ own dissections.

About 1540 Vesalius who was a Man of great parts & of equal Ambition arose, he Studied laboriously and was indefatigable in Anatomy — at 28 years of age he published, a large work which is still regarded as a Standerd work.

As Galen had applied himself chiefly to Com

parative

parative Anatomy, & had Taken many of his obser
vations from the Dessection of Brutes — Vesalius
frequently had Reason to Blame him & Contradict
many of his works which in so young a Man was
Looked upon as a presumption & his Cotemporaries
endeavour'd to degrade him —

In Vasalius's Time Anatomy was so much impro
ved that it was doubted whether it Could be carried any
Farther — In the year 1618 the great Doctor Harvy
surprised the world with his discovery of the Circu
lation of the Blood, an Account of which he had
read ten years before among the College of Physicians.

The advantages of his discovery were very Great,
as the they have been the means of producing many
more, & as it furnished us with a new method of
Investigating Diseases & unfolding many things
which till then were inexplicable

We may Justly say of Doctor Heavy that
he was a Man of great Penetration & at the same
time Indefatigable in his researches & that his
many other improvements ought to have gained
him

him more Honour than the Circulation for
if a few obvious Truths had been consider'd and
Prejudices laid aside; if the effects of Blood
Letting Bandages & some other Circumstances
of the like Nature had been properly attended to,
we shall wonder at its remaining so long a Time
in a Mysterious State But there are many things
of which we shall remain ignorant & it is proba
that Such a subject as the human Body will
always afford a larg field for the exercise of the un
- derstanding. —

The Passage of the Chyle into the Blood by
the Lacteals was soon after discover'd by Aselius &
the Thoracic Duct was soon after found out by Pi
quet. The Circulation between the Mother & the
Fetus was begun by Harvey in his Book de gene
- ratione Animalium and compleated by Swam
- erdam, Steno, or DeGraaf, for they all Lay claim
to it. — They say that every woman has a
Cluster of Eggs, one of which is impregnated by
the Animalcule of the Male seed, so that the Eggs
- is

is nothing more than a Nidus for its reception.

Hence they argued for the Similarity of Con-
-ception or Generation between Viviparous & Ovipa-
-rous Animals the One hatching within, the Other
without the Mother.

Leuwenhoeck sollicitous of accuracy in
his discoveries, was the first who made use of Micros-
-cope & he carried them so far that what seemed to the
naked eye a rude mass, appeared by his Glasses a
wounderfull piece of Mechanism, & he even pretended
to see the Animalcules swimming about in the male
Sperm — He Supposed that the animal (tho so
small that is computed that 300,000 of them are not
equal to a grain of Sand whose Diameter is but the 100
of an Inch) existed entire from the beginning; and
from the great analogy that this Doctrine bears to the
Vegetable of Plants from the neloniess of the Discovery,
and the air of Truth it seemed to carry with it, this be-
-came the General Revailing Opinion till within these
few years and was the Systema Vermiculare.

Ruysch about this time invented the art of
-injecting

injecting, & filled the whole Vascular Systeme with coloured wax.— He found Means to preserve Animal Substances and Was the first who used wet & dry preparations The greatest discovery that has been lately made is that the Lymphatics are an absolute Systeme entirely seperate from the Heart & Arteries, by my Great Master Doctor Hunter.

From these discoveries the present Anatomists have many advantages over the Antients who seem to be excelled by Moderns in no one Particular so much as in the knowledge of Anatomy.— Among the other inducements to the Study of this Science (in this age) is the frequency of Subjects & we may add that hardly any one has applied himself diligently to the Study of Anatomy without making some improvements or discoveries in it is remarkable that no good discoveries except those of Hunter & Hewson have been made these thirty or forty years. Although Anatomy has been so much encouraged: And the Modern Anatomists have been as much at a loss to account for the Structure of the Brain & Nerves as the Antients were for the

the Heart & Arteries.— What can be the cause of this?— Is the Subject exhausted?— No. nor would it become us to sit down contented with what we know, & say our Faculties are limited.— There is all the reason in the world to imagin that we are more ignorant than we know; There is still a vast field for us to improve and as an Incitement to our Industry, it will be necessary to remember that there are many Things which now are plain & Obvi-ous that were heretofore inexplicable.—

It seems Strange that anatomy should have been so long confined to a Single Profession es-pessially as its a Study that promises fair to bring the greatest advantage to Mankind— What of Subjects and the Aversion that Men have to dissecting hu-man Bodies seems to be the most probable Causes.— Few can at first bear to look at them with any composure.— Anatomy is an amazing field for Speculation.— Fontanelle prettily observes that Anatomy & Astronomy present us with two of the most Striking views of the great Attributes of the Deity.— In one we behold his immortality in

— the

the Magnificient Structure of the heavenly Bodies;
In the Other his amazing Wisdom in the wonderfull
mechanism of the Animal Body, which bespeaks
its Divine Master in the moste Convincing Manner

The Humaan Body by the Antients was called
Microcosmos as being an Epitome of every thing that was
curious in the world & they had many whimsical
Conceits about Galen in his Book de usu partium
which he tells us was design'd as a hymn to the
Creator. — He has given us such convincing proofs
of his knowledge that its to this Day as a master-
- ly performance Cicero dwells likewise much upon
the Structure of the human frame; when he wish
- es to prove the existence of a Deity from the Order of
the universe. —

The Knowledge of it is more particularly
the Interest & Concerning of those who Study Physick
Dissections of Dead Bodies can only inform where
we can act with safety in the Living one, & instill in
us a kind of inhumanity, (if I may be allowed the
expression) necessary to a proper use of our knives up
- on our Fellow Creatures. — Sydenham compares

a

a Physician who is ignorant of Anatomy, to a Sailor who is Ignorant, with his compass.

The Improvements in Modern Surgery have all arisen from our intimate knowledge of anatomy. — Hypocrates Observes that the knowledge of the constitutions is the first of Medical Enquiries.

Almost of our actions are meerly mechanical, if the human mind was endowed with Sufficiant Sagacity to Understand the Structure of the Human Body and the Nature of the Animal Oconomy we might even cure diseases in Embryo, this we must not expect to attain from the Limited State of our Faculties, Health & Disease are opposite to each other, therefore unless the State of the Body in Health be known well, we cannot however it is diseased. Hence Erasistratus & Herophilus opened living Bodies. The opinion is that little knowledge is necessary, but from the Testimony of

Galen

Galen, Hippocrates, Celsus, Harvey, Silvarin,
Hoffman, Boerhaave, Friend, Sydenham, Mead
and all other Medical Worthies, the excellency
of it is confessed. It is of such importance,
that all our best Physicians have either written
upon or taught it.

Its necessity in Surgery is evident, for by fre
quently dissecting dead Bodies, we inform the
Understanding, gives dexterity to the Hand and
insure Success to the operation upon the Living
Body.

The Difference between Ancient & Mo
dern Surgery is a Proof — Surgery, in the hands of an
Anatomist is an useful salutary, & (I had almost
said) a divine Art but when practiced by an igno
rant Man is barbarous and even Criminal. —
To continue Masters of any Art must have continu
al recourse to it. —

Attending Anatomical Lectures is reading
the Book of Nature, The Lecturer does not
make the Subject. he only prepares it & fixes
the

the attention of the Students. — Hence it is of Service even to Physicians & Surgeons to attend Anatomical Courses of Lectures

It may be asked to what purpose are so many Parts of the Human Body? — To Answer this Let any One in his own imagination make a Man & Suppose the Immaterial Part or Mind to be placed in the Corporeal System so as to be capable of communicating & having intercourse with material Beings; let him consider this & he will be soon convinced, that such a variety of parts & Organs are absolutely necessary to compleat such a Machine; And let him examine what he will need for his accomodations? First he will find him to require Organs for Receiving outward Impressions, — Hence the Organs of Sense are given us viz.t They Eye, Ear, Nose, &c. — Secondly the Mind must be supplied with Organs of Communication between herself & the Organs of Sense. — Hence the Nerves are created, which arise from the Brain & are ocbational Monitors. — And as Man was Made for a Social Animal he was provided

provided with the faculty of Speech that he might
move from place to place Limbs were given him
proper for Motion which are cloathed with Mus
cles & Tendons But to direct Motion, give Shape to
as well as defend and Strengthen the Body, Bones
are provided. to prevent which from being a Stiff
rigid Column, they are many in Number. — But
then it was necessary that these Should be connec
ted together with Sufficient Strength & yet admit
of due flexibiletj in the joints. Hence Ligaments
are made use of. — But as too hard unequal Surfaces
of Bones by rubbing one Another would wear down or
render Motion extreemely troublesom & uneasy.
the ends of Bones in Moveable joints are tipped
with Cartilage & the joints Supplied with a Suffi
cienty of lubricating Moisture or Mucus to keep
them alwayes moist & Slippery — And lastly the
whole is wrapped up in an adipose Cellular Membrane
& the common Integuments or the Skin &c. — As all
Bodies by constant motion must have particular
parts abraded it was necessary for the Machine to
have

have proper Organs to repair the waste. — Hence the Blood loaded with Nutritious & health Particles is carried from the Heart & is sufficiently fluid to pass through all the minutest Vessels & repair the waste that is daily making in the Body. — The Blood is carried from the Heart by Arteries & Returned by Veins, when impregnated to make fresh nourishment after being impoverished; & as some parts become superfluous & Excrementitious, Glands are provided to strain & depurate the noxious Particles, as well as for the Secretion of particular Juices. — Hence an uninterrupted Circulation is carried on to supply the deficiencies & to keep the Blood in a proper State of Fluidity. — But prior to the Blood we must have all the apparatus for Digestion as Mouth, Teeth Throat, Stomach, Gastric, & Enteric Liquors to prepare the Rudiments of the Blood the Ingesta having passed the Organs of Digestion, the finer and more nutritious Parts of it are absorbed by the Lacteals & carried by the Thoracic Duct to be mixed with the Blood when impoverished & with it to furnish

furnish a fresh Supply while the grosser Parts of the food are carried out of the Body The Circulation of the small vessels must be slow & Languid. —

Hence the Blood will be returned thicker to Reme-dy which inconvenience, the Lungs are provided to communicate, break down & liquify the returning Blood; but as too much would have been injurious, the Organs of respiration cool & temper the Heat arising from the rapid Motion of the Blood in the Lungs.

We have now a prety compleate Animal which may not improperly be compared to an Hydraulic Ma-chine, the whole very tubular and having the Tubes filled with circulating fluids, but its duration is limited & its decay like its growth gradual. — —

It may be asked since the Body is Supplied with continual nourishment &c. why it does not go on in-creasing till we become mere Monsters, & why it Shou. Stop at any such Growth? — Besides the Great Number of Reasons which may be assigned, the great All Wise Creator has ordain'd it otherwise. There is this which arises from the very action of Life its-elf

self. — The Circulation itself effects this in Time by turning the very fluids into Solids & by giving firmness & power of Resistence to the adjoining parts. — Hence the Solids increasing & the fluids deminishing in Quantity tend to make the gradual Growth of the Body till arrived at a certain magnitude by which time the Solids have obtained such a force as to propel the fluids with a greater momentum This Checks Growth for the Sides of the Vessels having acquired Strength of Resistence will admit of no farther Enlargement being distended with the fluids — A Vigorous Circulation compressing the small Vessels & the dense nutritious particles of the Blood stopping small Cavities of the Vessels daily, the duration of the animal being thus limited. — That the Species may be preserv'd Providence to put a finishing hand to his work has endowed each Sex with Organs of Generation and given them appetites which Strongly impels them to the Mutual enjoyment of each other to the propagation of their Species. —

The

The Method generally observed in Anatomical Lec
tures is either Anylytic or Synthetic; The Anylytic
when we take down & Examine the general parts
till we arrive at the most Simple — The Synthetic,
is when we begin with the most Simple & rise
to the most Compound Parts —

Hence Some Have begun their Demonstra
- tions from a fiber, a Membrane &c. — The Synthe
- tic Method in teaching is to be preferred; as an
Artist would follow it in teaching you to make
a Watch. — The Anylytic Method is principally
followed; but when both are combined, one Sup
plies the deficiencies of the Other —

As the Body is considerd as an Hydraulic
Machine & complex, a double equiry must be made
- concerning the Structure of the parts, the Laws &
Nature of their motions, — The one is called Ana
- tomy, the other Physiology or the doctrine of the ani
- mal Aconomy — The Doctrine of the Solids & Fluids
were Divided by the Antients into two Classes. — This
is the first division The Solids again were Divided
into

into Similar & dissimilar Parts, but by the moderns they are Divided into hard & Soft Viz.te — Osteology & Sarcology which latter is subdivided into My-ology, Splanghnology, Angiology, Neurology & Adenology. — There are three Species of Solids of an intermediate Nature as Cartilages or Gristles, Hair & Nails; the first thereof is darted with the Bones generally, the two last with the integuments. —

The fluids are divided into three Species as first, the Crude Viz.t the Chyle which is that kind of fluid receivd by taken into the Vessels & not yet thoroughly incorporated with the Blood, or what we observe from the Surface of the Body; Second into the perfect & ripe; as the Blood fully concocted Third the Depurated or Strained off parts from the mass of Blood the Secretions, some of which are excrementitious Others not so, but are to convey-ed to the Blood, as for Example the Bile, the Pancreatic Juice & Saliva, which are all Subsewent to digestion.

Whoever is desirous of being a good Anatomist should take nothing upon Supposition, but ought to See every thing & above all should dissect himself.

— then

then what he Gains that way will not only be a Lasting but an unerring knowledge A Man ought to take all his Ideas from fresh subjects as much as possible rather than from preperations, particularly our first Impressions. — Professors are too frequently fond of Prepe-rations & neglect the fresh Subjects too much — Doct.r Hunter says a Young Man should not read until he has seen a dissection or two. — By Means of preparations we can preserve things uncommon & Seldom to be met with & such as require much time & Labour to dissect & unravel the parts, as the Gravid uterus, Fatus &c. or any preternatural organization of parts. — Preparations are farther of use to show the minuteness of Anatomy as the Eye, Ear, &c. — There are two methods of preserving parts the One by means of Spirit, the other by drying & Varnishing but have some disadvantages, but the wet seems rather preferable.

The wet. Preparations will lose both their Color and Transparency, the Dry have their use, yet they will not retain their natural form & Size except — only

only the Bones. — But we should remember that preparations should not be used as Substitutes but as Supplements to the Body, always making some necessary allowance for the opacity &c. —

As to Physiology every plan hitherto offer'd has so much to be alledged against it; that it is doubtfull which plan is the most proper to follow. — It is properly inseperable with Anatomy. for he who makes the Body his particular Study is certainly most adequate to explain its Functions & to detect false reasoning; but all the actions are not to be explain'd therefore not to be attempted, as the Structure of the parts will not always correspond with the imaginary uses. —

Physiological Authors may be red with Advantage but Anatomical Books should by no means be Studied before we become tolerably well acquainted with the parts from the Book of Nature. —

In different demonstrations are better than the most accurate discriptions & most elegant Plates & figures, as they leave all to Judge for themselves. —

The Body has been very aptly compared to a

Circle —

Circle, by Hippocrates, therefore at whatever part we begin to explain its Structure, we are obliged to assume as known, the Structure of some other part. thus if we begin with explaining the Structure of the Brain, you find it necessary to have a knowledge of the Heart and Arteries & vice versa of any other Parts.—

The Bones have generally been begun with by Anatomists, because not so dependent on other parts.— But the first Question is what is Bone? Why it is made up of twen things, we know nothing of as yet—

Introductory Lectures are therefore Necessary, which were first invented by Nicholes & approved of by Hunter—

Therefore the Order to be observed in the following Course will be, first to premise a General account of the Structure of the parts, together with the most obvious Phænomina, & to take notice of the most prevailing opinions respecting them, Viz.t The Nature of the Blood, Blood vessels, Nerves, Glands, Cellular Membrane & Muscles, then to proceed to the Skeleton and Organs of Generation proper to each Set, then to

to the Viscera, after those a Child dissected for the Nerves & another for the Blood Vessels - then Shew the peculiarities of the fœtus, & Lastly perform the Different operations in Surgery upon the Subject

Addenda. When a Student perfectly understands Anatomy, Chemistry & Philosophy, he may Learn Physiology in Books & will be able to judge for himself & explodes Errors in them — Anatomical Books to a Student Should be compendious cheifly as they do not overburthen the Memory & perplex it. Hill is very concise, but Incorrect & bad — Heisters Compend is fuller & more exact & one of the Best — Cheselden has the Advantages of good figures & frequent Surgical Remarks —

The New System is the Best of all & the Minutest and He of Consequence the ~~Best~~ dryest for the young Students it is preferable to any other — For this system contains Monroe's Osteology & Neurology, Innes's Myology & Winslows Splangnology. — As to figures, Eustachens's may be considered as the best performance on account of Correctness Vesalius is very good, but not

so

So much like Nature Cowpers Anatomical figures.
are finely executed, all from Nature, but indistinct.
Albinus's figure of the Skeleton are also very good.
The figures of the Bones by Monnoier of Paris, are much
more elegant & correct than any other Persons. — On
Physiology Boerhaave's Institutes with Hallers' Notes
& Physiology & Notes, which are the most preferable,
may be (very useful to the young Student) consulted. —
Flemings Physiology, will be very useful to the young
Students, as being very plain & easy to be understood. —
Whytts Physiological works are very good, when
a Student has got a perfect or at least a tolerable know
ledge of Anatomy & Physiology. Then & not till then,
the works of the great Doctor Cullen should be put
into his hands. — —

The Epigastric region begins Immediately under the appendix ensiformis at a small superficial depression called the pit of the Stomach & in adult Subjects ends above the navel at a Terminate line supposed to be Drawn between the Last false Ribs on each Side

The Region is Subdivided into three parts, Epigastric region already Mentioned, & two lateral regions termed Hypocondriac, —

The Epigastric takes in all that Space which Lies between the false Ribs of both Sides, & the Hypogondria are the places covered by the false ribs

The Umbilical Region begins in adults, above the Navel at the Transverse Line already mentioned; and ends below the Navel at another Transverse Line Supposed to be drawn parallel to the former, between the two Crista of the Ossa Ilium

This Region is Likewise Divided into three parts, One Middle which is properly called The Regio umbilicalis;

_ umbilicalis; & two lateral, called Ilia or the flanks; & they comprehend the Space between the false ribs & upper part of the Ilium on each Side

The Hypogastric region is extended down ward from the inferior limit of the umbilical region and is Divided into three parts; one Middle, called pubis, & two lateral called pubes; Groins.

The Lumber Region is the posterior part of the Abdomen, & comprehends all that Space which reaches from the lowest ribs on each Side of the last Vertebræ of the Back, to the os sacrum and Neighbouring parts of the ossa illium.

The lateral Parts of this region are termed the Loins, but the Middle parts has no proper name in Men

Of Cartilages & Ligaments &c.

Cartilages are Compact of a Substance & a little elastic of which there are three Kinds Viz.t 1.st Such as supply the place of Bones, as the Nose, Trachea Arteria &c these preserves the Structure of the parts & admit of Motion — 2.nd Those that Supply the place of Bones before they are formed as in the Fœtus &c. — 3.d Such as serve for the Articulation of Bones —

Cartilage diff.r from Bones in not having Blood Vessels or fibers to be Discovered, tho they are supposed to be Vascular.

At the Articulation of Joints they prevent Abrasion by their smoothness; they will not granulate or exfoliate, but they may be Corroded —

Ligaments.

Ligm.ts are firm, Unelastic, compact, Membranous Substances serving to connect the Joints & prevent Luxations — Ligaments Bones, Cartilages, Tendons and Dura Mater are not mentioned to have much Sensation in a Natural State. — See White & Haller

The Capsular Ligaments are very strong & com-
-pact, made up of two Lamella — 1. the Inner Lamela
being a Reflected membrane going over the head of the
Joint, covering the Cartilage so coming to join the Exte-
-nal Lamella, which is firmly inserted near the Joint
— These Ligaments form a Sac, in which is contain'd
a Mucalaginous Liquor, serving to lubricate the Joints
for Motion — There are Termd Synovial Glands which dis
charge the Synovia, this is subject to be disorded — 1st
By becoming thin & Sichorous — 2 Thick or Inspisated &c —
It is Generally Received of Late that Capsular Ligaments are
broken in a Luxation of the Joints —

— There are some Bones we observe are Long & Cylen
drical as the Femoris & Humeri, Others that are wide as
the Os Scapula-os Innominatum &c other Irregular as the
Vertebra — the Cylindrical Bones are larger at the Ends than
the Middle — There are two Kinds of eminences one called
Epiphysis, the Other Apophysis — the Apophysis is an Irre
gular ossification or elongation of the Bone. — The Epi
physis is an additional Ossification to a bone — one would
Suppose one of the Cylindrical Bones were weaker than the
ends whole are more thick; — but it is not for the fibers
are more closely connected & more Solid than the ends which
are Spungy — —

Lecture II

If we ware only to consider the Gross parts of the Body we might begin with the Bones. then the Mescels. next the Nerves &c. But as we are to enquire into the particular Structure of the different Parts which are composed of very heterogeneous qualities. we must be=gin our enquiries with the most minute Parts their general nature & properties — The parts are first to be considered in a general way and as the fluids which the Vessels carry have less de=pendance on the Solids than the Solids on the fluids they seem most proper to begin with.

Of the Blood

The Blood in the Scripture Language is said to be the Life of the Animal and Doctr Harvey has a curious Chapter con=cerning it, in that Sense. He thinks it is the part in which the Soul resides, the Primum vivens & the ultimum moriens: He also ima=gines the first motion is in the Blood; and that it throws the Solids into action — Haller agrees in this particular and it has in all

all Ages been look'd upon the immediate Seat of Life. In the human Subject it is naturally red but not necessary for the nourishment of the Body as in the smaller Animals, it is not of that Colour — It is neither Acid nor Alkaline in a healthy person tho a little Saltish to the Taste — It is not Homogene= =ous as it seems at first but it is in reality a heterogeneous — gummy aqueous fluid: the greatest Part mixes with Water. — The Specific gravity is a little more than water. tho the Difference of weight is very inconsiderable — Boyle computes it in the ratio of 1041 to 1000. Turner & Martin as 1054 to 1000.

If we consider how many things enter into the Composition of Blood we shall then be satisfied that it is heterogeneous — We might readily enough imagine it to be made up of a variety of Parts in reasoning a priori from our Diet tho this is not Con= =clusive and a Posteriori from the Secretions are made from the Blood being very different as Wax, Bile, Saliva Urine &c.

There are three ways of obtaining the Composition of the Blood 1st By Microscopes — 2d by Chemistry — 3d by Observations on it when drawn from the living the living Body & mixing it with various sorts of fluids.

Leuenhoeck with others agrees that the largest Globu= =les

=les are red. Haller thinks that then Globules are only seen in cold animals as fish. frogs &c — They are said to be nearly of the same size in all Animals from the largest to the smallest. Doct.r Turner says that 340 Globules make an Inch in Length. Haller thinks they are still smaller and the quantity different and are more fluid and thick or more thin & watery in different circumstances.

The red globules are the heaviest part and fall to the Bot=
=tom of the Vessels. Doct.r Haller thinks that the Heart moves before there is Red Blood. He considers the Anima as the princi=
=pel of the Blood as the Instrument by which all the functions of the Body are performed.

The Antients used to make great distinction be=
=tween the Animus and the Anima. The Animus they thought was seated in the Brain and was the faculty by which we thought, Judged, Reasoned &c but the Anima they thought was seated in the Blood and was the Actuating Principle that governed the Vital Actions about which it was wholly employed. The shape of the Globules is not certainly known

Lewenhoeck says they are lenticular, oval or oblong and they alter their shape in passing through small Ves=
=sels tho. it is not conformed by late Authors. He says that a Red Globule swimming in a thinner fluid is composed of 6 smaller

Globules

Globules which he called Serous and each of them were made up of 6 smaller which he called Lymph which therefore were the Basis of the Blood and Doct.r Martin confirms this Doctrine He says he could observe that such red Globules would all tumble into their constituent ones and thence loose their Red Colour and become Serum — This seemed to agree with some Phenomina of Health as the Blood is less red in Iuney inactive persons then in those who are more Active and Robust.

The Blood say they is composed by the action of the Solids and must be so when the pressure of the Atmosphere is greatest when the pressure is least the Blood will be more rarified & pass thro parts which are more weak and consequently cause pain. — hence the reason why people with sore Legs &c. have greater pain at the change of weather from Dry to moist. In the latter the pressure of the Atmosphere is less on the Body the Blood will be rarified and the Vessels distended so as to cause pain. the falling sickness, the periodical monthly return of this complaint. they account in this manner — Lewenhoeck further says that he could not discover that a Globule of Lymph is made up of 6 smaller ones. he supposes it probable. nay he went so far as to say he saw vessels that could admit of Globules of the fifth serous only; but Haller and the Modern Physiologists say that no vessel but those which carry Red Globules can be distinguished: the others carrying a transparient fluid are not

not to be distinguished from membranes, hence Leuenhoeck's doctrine is Theorical only. Serum is heavier then Lymph, but lighter than red Globules. Blood taken from an Animal in health soon congeals & afterwards seperates into Serum & Crassamentum.

The Serum has generally a Yallowish tinge, & is not Glutinous but perfectly fluid, tho not quite so thin as water, but rather like Milk. if Boiled the greater part congeals like the White of an Egg, when boiling a thin Vapour arises & also a little Water then remains, likewise when put into Spirits of wine it thickens as does the white of an Egg in proportion to the Spirits — Doctr Haven observes that the Serum is not the same as the white of an Egg, for if mixed with water it does not coagulate as the white of an Egg does, but the difference if attended to is not so great in this respect tho in themselves there is a meterial difference.

Boerhaave observes that as Serum is fixed by a cer= =tain degree of heat, an Animal cannot live in a heat more than 100°. which Coagulates the Blood out of the Body — A Pupil of Doctr Haller's says that Animals viz: Dogs on which he made his Ex= =periments stood 144° of heat, what fixes the Blood out of the Body will not do it in the Body being there subject to the Vis vitæ. The Beauty of Poeperation is injured by Spirits, as it coagulates the Serum or Lymph: such fluids as resist putrefaction preserve the Beauty of them more than Spirits, as Salt & Water, Nitre &

Water,

Water. — But they are soon liable to decay, the dilution of a lit=
=tle water makes it Transparent by destroying the earthy particles
— Sizy Blood has a Buffy colord appearance, & some have
thought it to be occasioned by the heat of fevers, which, as it were
boiled and Coagulated. : but this cannot happen, for then the Ani=
=mal could not recover, it must therefore be owing to some other Cause
this appearance is fallacious, coming from a vein when the Blood
flows fast, it continues warm longer, and the red Globules have more
time to subside, and this buffy appearance then turns up this Appear=
=ance is owing to the Gluten of the Blood — The Crassamentum
has all the red Globules and Coagulable Lymph, and is the heaviest
part — The reason that it swims, is because the superior part
is Dryed by the Air — In the Crassamentum consists the Gela=
=tinous part — It is manifest by experiment, that the Gluten being
taken from the Blood the rest will remain fluid; while the blood is
Cooling, stir it with a rough Stick, by which means that part which
is called the Coagulable Lymph, will adhere to the Stick, and what
remains will be a serous fluid of a red colour, composed of the red
Globules and Serum, (the coagulable Lymph or Gluten, which united
the red Globules together, being seperated.) this serous fluid will not
afterwards change — When the coagulable Lymph or Gluten is steep=
=ed in water it comes out rather white, this is the part that unites
the red Globules and makes the Crassamentum — There

There is some similitude between Blood and Milk, mixed with Rennet — It is not heat, But motion that keeps the Blood fluid, when it stagnates in the Body it is resolved into Serum and Crassamentum; the thin part is again taken up and carried off, and the Glutenous remains. this is manifest, when by a blow on the forehead some of the small vessels are ruptur,d, and a tumor succeeds. — In Arteries a tumor is form'd called Polypus, which is at first tender, but afterwards it becomes firm, and when steeped it becomes white, sometimes it runs into finer branches and forms filaments — In Aneurisms the same thing happens, and it becomes firmer in proportion to the Time and Pressure — By this, we may know what Severinus's Snake was, which was found in the Aorta or one of the ventricals. it being only a Polypus which had accidentally taken the appearance of a Snakes head which he has painted as such. — If Blood remains in any cavity it becomes firmer as in the uterus, if it is not soon thrown off, it comes away in Clods, as in Miscarriages; which often deceives Nurses and they taking it for a fleshy substance because say they it becomes White by steeping it in Water and it has been called false Conception to distinguish it from the true because it has neither Child nor Membrane. And in reality both it and Polypus are only concretions and not Organized having neither blood vessels nor fibers — Doctr Hunter had a Case of a Woman who in the third year of her Pregnancy was seized with a flooding every time the Clodders came away the

Assistants

Assistants and Nurse thought it must be a Conception and told the Women it was over, upon the Doctr examination of the Clod=
=ders, he told her she had not miscarried which the Woman hardly believed, but imagined she had what they call a false Conception; she went on and in about a fortnight after as she was walking along the Room, something came from her which being sent to the Doctr he perceiv.d was the miscarriage — And the little pla=
=centa being there he pronounced it accordingly; great caution should be used in prognosticating in the Cases. What Ruyschs membrane of the Blood as appears from the same reasoning, he says the Blood has a disposition to form Membranes, which is nothing else than a Collection of the Glutinous part very different from the red fibers in the Body, it has indeed the appearance only from drawing a wire or the like thro it, but there are no red fibers to be found in the Blood. Some from the same causes have said they have seen hairs in the Blood, tho it was only the Gluten with the resemblence — It is this Gluten that stops Haem=
=orrhages stuffing up the ends of the Vessels like a Cork as Petit says

The Serum has a different appearance in different Sub=
=jects sometimes as white as Milk.

Lower thinks it to be from a sudden mixture of the Chyle with the Blood — Doctr Hunter saw an instance of it in a Baker where

where the appearance of the Serum was exactly like that of sick milk or Cream whilst the Crassamentum was of a good Colour, he was of opinion that it could not be owing to the Chyle mixing with the Blood as the Man had eat nothing for many hours together before, nor was their any thing from his health or Diet that he could explain it.

Blood Chemically examined or distilled with a Degree of animal heat viz^{t} in health rises in some quantity, with a Degree of heat equal to that of Boiling water near ℥vij out of ℥viij will come over mere Phlegm or Water according to Boerhaave and a dry Crust re= =main. If you add still a greater heat, an oily, bitter or alkaline Spirit with a volatile oily Salt like that of harts horn concreting around the mouth of the Vessel ascends, then a Gallowish oil which becomes more Gallow or Faetid and Brackish as the Destillation is continued and the Caput mortuum being burnt till it is divest= =ed of its remaining oil gives a little Virgin Earth. — A condensed air is in the Blood there being as much air in 323 ℔s of Blood as will weigh 31 ℔s which when rarified will be 100 times the Bulk of that quantity of Blood. Doct^{r} Martin hos made his calculation from Boyle and others Viz^{t}

Of Water 5 parts in 6 parts of Blood
Oil — 1 D^{o} — 15 D^{o}
Salt — 1 D^{o} — 25 D^{o}

Earth

Of Earth 1 Part in 75 parts of Blood.
Consolid.t Air 1.. D.o ___ 28.. D.o

. Air is let loose by by boiling or Putrifaction

The residuum or Caput mortuum remaining in the
Still consists of visied Empyreumatic oil and virgin Earth and in
an open fire the Oil is forced off and leaves the earth. — In a healthful
state of the Body the Blood is neither Acid nor Alkaline, but Alkalescent
and putrescent if kept, when first drawn it is Nutral. — Ancients
thought it advisable to give Salts to cool the Blood, but mixtures out
of the Body joined with the Blood howe not the same effect as when
taken in to the Body: for then the vessel the powers of digestion and cer=
=tainly must be very much alter,d by undergoing this change. —
With Salt of Harts horn out of the Body it grows dark Colo,d and
does not Jelly, is of a cream consistance and thinner and with distilled
Venigar it grows blacker and thicker than at first. — With Spirit
of Sea Salt if mixed with Water it does not Coagulate but is of a dark
brown Colour and keeps pritty fluid. — With foliated Tartar the
Colour is at first very red, but on standing soon congeals and Ap=
=pears like Blood not mixed — If Blood after standing a while
is not Sizy at the top, it is Red and at the Bottom Black, pro=
=bable from the action of the Air, as proved by an experiment of
Doct.r Hunters in a vial filled with Blood and immediately

Corked

corked, the part in contact with the Cork was of a bright red Colour owing to a Globule of Air that had got in; all the rest was of a dark Colour.

The difference between the Venal and Arterial Blood is not as great as has been imagined by the Antients Yet the Blood is of a brighter Colour in the Arteries than in the Veins, owing probably to its brisker motion and the greater action of the Arteries on it, as Venal Blood shaken in a vial puts on the appearance of Arterial.

Hence the reason why its returns so florid from the Lungs, as it moves more briskly thro them. May it not also be owing in some mea=
=sure to the effects of the Air, as its effects out of the Body cause that appearance? The Ancient Physiologists imagined the Arte=
=ries carried Vital Spirits and the veins red Blood, being ignorant of the Laws of Circulation.

Of Arteries

An Artery in an Animal body is a Strong, elastic ramifying Tube, arising from the Heart and going to all parts of the

of the Body: in this Sense there are but two Arteries viz.t the Aorta and Arteria Pulmonalis: the latter distributes Blood to the Lungs the former to all parts of the Body besides.

The Blood in these two Arteries is very different. — In the Aorta it is fit for nourishment, and being deprived of its nutritious quality in its passage through the Body, passes thro the Lungs to be elaborated again and made fit for nutrition. —

Artery in Greek signifies a carrier of Air; The Bronchia being made of Gristles and being therefore Roughish was called Aspera Arteria: till the time of Erasistratus the Arteries and Veins had the same Name Viz.t they were both called Veins but the Arteries were called pulsative, for distinction and it was he who first called them Arteries. — The Section of the Blood Vessels both Arteries and Veins when filled with Blood is round except just at the Ramifications and there it is oval or Eliptical.

The Aorta from begining to end is conical becoming smaller and smaller in its Coarse but the dimentions of all the Arteries taken together are larger than those of the Trunk, and therefore there is a constant enlargement of every Ramification. —

The space between the Branches was thought by the Ancients to grow smaller constantly from the Heart, but from Observation it is found that in many places the difference is exceeding small

small nay Doctr Hunter has said that they seemed to him to in=
=crease in Size, but Mr Jnr Hunter with Malpighi thinks they
grow rather smaller. but it is very inconsiderable at any place where
we can make the observation by reason of the frequent branching. —

The Carotid is the only one in the human Body where such an
observation can be made — The Branches generally go off at acute
angles, tho some go off nearly at right Angles, the latter are near the
Heart, the former towards the extremities: and in general the nearer
to the Heart they branch the more they approach to an Obtuse An=
=gle, and the more remote from the Heart, the more Acute is the Ra=
=mification. — We have not quite an Instance of an Artery's being
reflected, so as to form an Obtuse Angle by its Branches: The Epigas=
=tric was said to be such a reflected branch, but if we examine it
we shall find it goes off in less than a right angle, and is gradually
reflected so as to run in a course directly backwards to that of the
Trunk. — The branches from anastomoses, are frequently at right
angles i.e. where they open into one another which they often do, and form
a kind of Net work.

Branches of Arteries are different from those of trees as they
unite again, ~~as Trees~~ but those of Trees do not. — In the Kid=
=neys, they do not anastomose. — The largest anastomosis is in
the Basis of the Scull made by the two Vertebrals, near the For=
=amen magnum Occipitis. — Small Branches of

Arteries

Arteries frequently anastomose, the advantage accreuing from this is, that the Blood is thoroughly mixed, also an Equilibrium is kept up, if one branch is obstructed, it passes through another or if it be too full it passes to the collateral branches. — The other advantage is, that when an Artery is destroyed for a time that part may have its nourishment from another; as in the aneurism, where the greatest Artery in the Arm is destroyed. The Limb would mortify, ware it not for these lateral commu=
=nications.

There are two kinds of Arteries Viz.t Sanguiferous & Serous according to Shippens Doctrine, tho the two former might be sufficient. — Boerhaaves Error Loci, may be accounted for from hence, and is founded upon it. Viz.t when Serous Arteries are distended with red Globules.

The Arteries begin in the heart, and terminate in the external Branches. — 1st ly the greatest terminate in Veins 2nd ly some in Glands. i.e. in Secretory Vessels. — 3rd ly upon Sur=
=faces, as in the Spongy Surface of the Penis, where the Arteries open into the Spongy cells; and we believe that the perspiratory Vessels or exhalants, are continuations of Arteries, the transu=
=dation may better account for them.

Situation

Situation

The Arteries begin almost in the Center of the Body and run nearly in the Center of each Limb giving a branch to every part

Mr Jnº Hunter observed that branches near the Heart go off at right Angles, which in some measure lessens the Impetus of the Bloods motion and at a distance at Acute Angles to quicken in some measure the Velocity. — Arteries in their march thro' places run Serpentine, or are convoluted as in the uterus, because of the greatest distension at different times of Gestation, according to Doctr Friends observations, but Doctr Hunter thinks that is not the reason, for in the greatest distension, the Artery is more convoluted: which is therefore to answer some other purpose. — There are Valves in the Arteries but only in the beginnings Vizt in the Aorta and Pulmonary Artery, which prevent the return of the Blood back into the heart. — The Valves are generally made up of three folds or membranes, there are instances only of two.

Anatomists have been accustomed to devide the Substance of the Body into different layers, the Coats of Arteries are said by some Authors to be muscular, but Muscles are red and not elastic, but the Coats of the Arteries are white and very elastic both in longitudinal and transverse

and transverse direction; the large Artery of an Ox will prove this; therefore they are not muscular, but very elastic, in Texture resembling the ligamentum colli, or white leather in Brutes.

The Coats of an Artery are of some considerable thickness and Anatomists divide them into an internal coat which has a smooth internal Surface with a fine Polish, except where branches go off. — This is very thick, and closely united to the next outer coat, the fibers are of a very fine texture, their course not to be seen.

The Uses of this Coat are two, first to give free course to the Blood, secondly to prevent the red Globules from transuding. — In the dead Subject or soon after Death these do transude but it is not because the pores are more open, but because the Blood has lost its Tenacity. — The other Coat is composed of circular fibers, having a slight Cohesion to each other of the same substance.

Arteries lie in the interstices of parts surrounded with the cellular Membrane which some have described as the nervous Coat of the Artery, so called by the Ancients. — This is not properly a Coat, but a connecting medium between the Artery and the Muscles every fibre being surrounded in the same manner this was then their fourth Coat, a fifth Coat is added by some in particular parts as the Pericardium, Peritoneum, tho very improperly — There are three Coats only which is the most just opinion 1st the outer Coat is Cellular.

the

the middle Coat is a ligamento - muscular Coat and the inner Coat is a smooth compact Substance finely polished by the influent Blood.

The Coats of an Artery have Blood Vessels like other parts, called *Vasa vasorum*, but the Blood in them is not red, this may be seen in a preparation first injected minutely with Red, then the Red forced out and green thrown in its Room which being of a darker colour permits the red vasa vasorum to be seen.

Blood enters into the combination of every part but of some in no great quantity or not so as to carry red Globules, hence their Vessels appear white, nervous filaments are also bestowed on them, tho not so easily Demonstrated and are supposed to serve some important use. — The whole Body of the Artery is elastic and has different strata or layers for different purposes: and from their being in all directions they bring the Artery to its former state and Strengthen the Artery both Literally and longitudenally which is more expanded than lengthened by the Blood.

The internal Coat answers two purposes. it both gives a smooth surface, and does not hinder the Circulation, and is — dense in Texture that the fine parts may not transude. — After Death the Red Globules will transude, but not in the living Body, be= -cause the Blood is thoroughly mixed with the Gluter, which gives it some degree of Tenacity, tis probable that when the red Globules

transude

Transude after Death that the pores are not altered but that the Glutenus part is in a coagulated State; the particles being attracted to each other; thus the remaining part being thinner. transudes.

The bile Transudes in a living Body, tho the Blood does not, as may be seen by opening a body immediately after Death; all the parts near the Gall bladder being of a Yellowish hue.

There is a two fold motion of the Arteries Viz^{t} Systole and diastole, the first is their Contraction, the second their expansion or dilation and this motion is owing to a Gush of Blood from the heart, which drives the Blood on before it and the Artery yields by its elasticity to the greater quantity of Blood pressing Vice versum. hence the Artery becomes more capacious and also something longer. the convolutions may be seen in the Lungs of a Snake or Viper which are very long and have an Artery running their whole length. The Systole of the Heart is the Distole of the Artery and vice versa but the diastole of the Arteries takes up much less time than their Systole, there being some considerable time between the Strokes of the Pulse.

Doct^{r} Hales made an experiment in order to know what force the Heart exerts in throwing the Blood in the Arterial System. He open'd the Carotid Artery of a Mare and fixed a Glass Tube into it, and after the Blood had rose therein to the height of the

of the same, but its weight overcame the force of the Heart, so that the Animal could not bleed to Death. — and the Blood rose and fell alternately in the Glass Tube, and those two Motions in the Tube represented the two motions of the Heart and Arteries. —

When the Heart contracted and propell'd the Blood with a jirk, the Blood rose in the tube, but on the intermission thereof or in the Systole of the Arteries it fell much.

The Pulse from the Touch is generally imagined to swell much more than it does, which is so little as to be scarce perceptable by the Eye; but the Stroke is larger in proportion to the Size of the Artery, and may be rendered visable by Art.

This Swell is not in all parts of the Artery at the same time; tho an explanation of this proposition is attempted by supposing that the Arteries being full of Blood, at each Stroke the Blood is thrust forwards thro the whole Canal and at both ends at the same time by the Subsequent Blood which is thrown out from the Heart and which at the same instant propels all the Blood which is before it. — If the Arteries were rigid Pipes of Brass or Silver this might be a proper method of reasoning, but as the Coats are Elastic we may Judge a priori; that the motion is successive which is perceptible indeed by feeling the Carotid Artery and that in the inside of the Ancle together

which

which are not synchronous in their pulsations, as we have just time enough to attend to their difference, so that the pulse is successive, but very quick: This swell or pulsation of the Artery will grow less and less perceptably from the beginning to the end and the least Arteries will have a lesser swell in proportion to thier size, because all the branches taken together are larger than their Trunks and hence their impetus will be taken off.

Another reason is that the action from the beginning of the Artery to the branch will not be so strong, because the Heart acts by jerks, when the Heart ceases to act, the nearest part of the Artery will swell and then contract again, but at a distance the Artery will be kept almost always distended; for after the the action of the Heart ceases, the Contraction of the Artery follows successively from its trunks to its branches which two powers acting alternately, and the power Viz.ᵗ the action of the Heart still growing weaker the Blood at a distance from the Heart will not move in jirks as after the Heart ceases to to act, all the Arteries lying between the Heart and their distant Vessels contract along in an undulatory manner, hence in remote branches the Blood runs in a more equal Stream, for this Reason the Pulse diminish, and in fleshy parts is not perceptable because of so many Branches.

The Heart originally carries on the Circulation and the

Arteries

Arteries react on the Blood by contracting; hence we see the neces-
=sity of their being possessed of ligamentous Fibers.

That the force of the Heart is not so considerable as some have imagined, is plain in this instance, Viz" that a Child, who soon drops its Navil string, the Cicatrix is then thin and yet it does not Bleed, but after Death we see by injections that when the Arteries are full; by pushing on with a little force, the Navil String will break, which shews that the force of Injection is greater than the natural force of the Heart.

The Artery is always full of blood, only the Column of Blood is some times larger, and some times smaller according as the Heart is in its Systole or Diastole. The Blood some-
=times moving with more, sometimes with less Velocity, but is al-
=ways in motion, it runs with the greatest rapidity near the heart in large Arteries, and with less in small ones more distant from the Heart (because their small branches all taken together are larger than the Trunk, as has been said) for the same reason that a River at a narrow part is very rapid, but where wider runs more slowly.

This also explains why an Artery near the Heart bleeds with interuption, but in small Arteries in a continued Stream, only some-
=times quicker and some times slower.

In an Aneurism it moves more slowly in the large part than

than in the smaller, when the motion of the Blood is examined with Glasses it appears to move faster than it really does as the space it passes thro is magnified by the Glasses. — Heil com= =putes the alacrity of the Blood as to the Time it takes up in mov= =ing thro a small Capillary as 1000 to 1. But Doctr. Hunter and Haller think it cannot be so great. — The effect of Arteriotomy, besides taking a quantity of Blood, Bellini imagined would be an increase of its motion, between the part opend and the Heart. — It is found to obtain not only their but also in the neighbouring parts by lessening the resistance. — By puncturing an Artery you also occation a retrogate motion as Haller found from the same Cause, and the Blood rushes out from all the adjacient Vessels. Haller was not sensible of any intes= =tine motion in the Blood, but it seemd to him in his observations to be going on equally; but he took notice that the Column of Blood is interrupted in the Arteries some times by air which had got in by some means or other. — In the small Arteries however the Blood flows irregularly, where the small Anastomoses are there the motion of the Blood is not so well seen as it sometimes seems to stop and anon whele to run forward. — Some have imagined that the Blood Glo= =bules have a Retrogate motion on their Axes as well as projectile —

A hard or soft Pulse depends on the State of the Arterial Coats, principally as they are more or less yielding. — The hard

hard Pulse proceeds from rigidity and tension; The soft Pulse from the Coats being more Yielding and less Tense.

These are taken great notice of in the modern Practice near the Crisis of a fever, when the Solids become relaxed and the pulse is soft. — 1st A large and a small Pulse depends on the Quantity of Blood thrown out of the Heart, as also the Strong and the Weak on the same cause or rather on the force of the Heart; if the Quantity be great, the Pulse will be large, but a small Pulse will appear if the Quanty is little. — 2nd On the Coats of the Arteries being more or less Yielding and on more blood being kept in the Arterial System depend the slow and Quick Pulse: If the Arteries are very Yielding the Blood will be collected in a greater quantity in them and will not so soon be forced into the Venal System hence the pulse will be fuller. By a Quick Pulse in common Language is meant the frequent action of the Heart. — In Physology is meant the time in which the Strokes is itself given, but it is difficult to distinguish. — A regular and irregular pulse depends on the State of the Heart, an intermittent pulse is where a Stroke is now and then missing. this generally depends on the State of the Artery, which may in some measure have lost its elasticity or on the weakness of the Heart itself, on which account the Heart not being able to contract, suspends its action for a while, till it receives a fresh supply of Blood or Animal Spirits and then renews its action. — Some

Persons

Persons are very sensible of this intermission. from a Struggle or Anxi-
-ety of the Heart, Mr Page was sensible of this whose Case we shall have
Occation to Mention hereafter. — In some Cases we have an Alarming
Circumstance — In others we have not. — Adhesion of the
Pericardium, or too much Liquor Pericardii. or any thing that ir-
-ritates may occasion this.

The Ancients made but very little use of the Pulse.
Hippocrates knew the Pulse and attended to its diseases but not so
much as the Modern Physicians do. the discovery of the Circulation
having thrown great light on this affair.

The Knowledge of the Pulse is to be acquired with great
difficulty. for the pulse is altered in many Circumstances as in Seze.
Age &c. It is said to be quicker in the Evening than in the Morning
exercise and hearty meals also increase it as does likewise Weather and
State of the mind, and sometime an alteration in dress. — The Pulse
is quicker in small than in large Animals. in Young than in old. —

Great Attention ought therefore to be given to the pulse as it de-
-pends on so many Circumstances and is of such importance
in forming Prognosis. — An Accurat knowledge of it is acquired
by nice observation and practice; and we ought to be encouraged
in persuit of this. when we reflect on the instances which are given
us by the exquisite accuracy of the touch, insomuch that
blind Men by Close and deligent Application have arrived at

Such

such a Degree of Perfection by the Touch, as by that alone to distinguish Colours.

Of the diseases of Arteries

These are various and first of Aneurisms. — This is of two kinds. when all the Coats are stretched or swell'd. 'tis call'd a true Aneurism but if an Artery is torn or wounded and the blood makes a Tumor it is called a false aneurism. — An Artery does not easily suppurate, nor is it easily consum'd by matter which is a very happy case. as Arteries in the interstices of Muscels are often dissected with matter lying about them. — Aneurisms seldom happen from In= =ternal causes. — Ossification of Arteries are more frequent, it begins on the inside of the Arteries and shoots outwards. — It Osi= =fies in the extremeties first; as in the case of a Person at Gorges Hos= =pital where the Artery of the Wrist was Ossified, so that each Pulse a crackling might be heard. — In old People who have Mortifications the Arteries are often Ossified which takes off the impetus of the Blood Authors say our Solids grow more rigid, hard, and tough and

nearer

nearer to the Bone as we advance in Years. and this is the Reason why Ossifications are found in old People.

It appears highly Probably that a peculiarity of Constitutions lays the Chief foundation, as some constitutions have a propensity to generate the Stone in the Bladder, Exostoses &c. and that it is not principally the Effect of old age. — Doct.r Hunter dessected a man of 105 Years of age and took particular notice of the Arteries and found none of them in the least Ossified, contrary to his great expectation. — In Mortifications the Blood coagulates in the Arteries which hinders its circulation in that part, this is the Reason Why the Ancients (before tying up the Vessels was practised) chose to cut off the Limb in the mortified part and not above as is done now, because then there was no bleeding — But this was very troublesome, it taking up a long time before the mortified part digested off, besides the danger of the Mortification spreading and thus defeated the end of Amputation.

Of Veins

Veins have a great Analogy to Arteries, being Strong Elastic

Elastic ramifying Tubes. but not in so great a degree, the coats of Veins are much thinner than those of Arteries. — What has been said of Arteries may be said of Veins, as to their anastomosing, branching Course &c. Veins have Arteries for their nourishment, As Arteries themselves have, called *Arteriæ venarum*.

In the Stomach and intestines the Arteris and Veins give of branches together. — Veins have nearly the same quantity of Blood to carry as Arteries, but are larger otherwise as they have thinner coats. would be more liable to be dilated by the motion of the Blood which from that cause is slower in them. — In Veins the circulation is quicker as it comes nearer the heart for the same Reason as mentioned in the Arteries Viz.t because the Trunk there is smaller than its Branches, All the Veins terminate in the Heart except one Viz.t the *Vena Porta* which terminates in the Liver. — The beginning of the Veins is Physiologically at their Branches but anatomically at the Heart. — The Veins are three in number Viz.t 1.st *Vena Cava* 2.nd *Vena Pulmonalis*. 3.d *Vena Porta*. — The 2.nd of these was not known till injected and Microscopes brought them to light. — An Artery continued on makes a Vein; or it is a reflected Artery with some irregularity if we inject by an Artery it returns by the Veins. —

Quicksilver thus passing to the Veins does not prove a Continuation but a communication, for it might be carried to a Cell and be taken up again

again by the Veins; but Mushbrock proves it. — A Preparation of Tallow and Vermillion proves it, injected into the Pia mater, the Vermil=lion will often stand in the Artery and the Tallow return colourless by the Veins. — A hand injected with Quick-Silver thro the Artery will return by the Veins very minutely by a good preparation.

Veins as well as Arteries are divided by anatamists into Sanguerous and Serous. — The Lymphands are now known to be a dis=tinct System. — The General distribution is the same, but is different in the extremities as deep seated with Arteries and superficial without Arteries

In the Arm there are two deep seated with Arteries and also many Cuteneous ones; als in the lower Extremities. — The Reason of this is probable from strong muscular motion being used in the Arms, it would prevent the free return of the Blood; but these Cute=neous ones help to take off the impediment. — And we see if we Clinch the fist, these superficial veins fill and hence the Reason Why in Blood letting, it is generally necessary to make the Patient put his hand in this Position.

There are Veins which are supposed to begin from the internal Surface of Cavities; as in the Penis. — But the Absorbent veins are demonstrable such as the Lymphatics. — Veins are furnished with Valves. — The Valves are made up of two loose membranes

Joining

joining with their Edges; and sometimes of three especially of longer Animals as Horses &c. and these prevent the return of the Blood. — The Valves make a little knot on the Veins. — In the human Body the Valves are in Pairs the general use is to prevent the Bloods returning Back.

Valves are not in all Veins, there are none in those of the viscera, Brain Lungs &c. They are found in the extremities chiefly —

It has been said that as our Arms and Legs are more generally in a perpendicular State and that if it ware not for the Valves the Pressure of the Column above would retard the Circulation, but this does not seem to be the Reason, as the Iliacs have none; but rather that the Circulation might be quickened by muscular motion. as we find the more violent exercise we us and the greater our Muscular motion the quicker is our Circulation and as the Bellies of Muscles swell in their Contraction, the Blood would be compressed in the veins both forwards and backwards whereas the Valves now hinder its returning back and therefore it must be driven forwards. They are commonly in pritty large Veins and placed irregularly and not in very small ones. If it ware not for the Valves we should be subject to Various swellings as they divide a great length of Column into many smaller ones, the pressure is less, but this not the Principle use of them as was said before, or else the so great of the vena Cava would not be with out them but by means of these Valves every literal pressure quicken the Circulation and Hurries the Blood towards the Heart.

Veins

Veins that lie upon Arteries seem to have a Pulsation, which is only the action of the subjacent Artery. — Hence the Surgeon upon opening such a Vein is afraid he has wounded an Artery and this most frequently happens in fevers where the Arteries act more strongly. — Some veins near the Heart have something like a Pulse or swelling and subsiding which is owing to the action of the Heart giving a momentary Stop to the Blood and occasioning an undulation. — In the Veins of the neck there is a manifest rising and falling, also in those of the Brain which is owing to respiration. —

The Vein answering to an Artery is generally larger, and the Veins have no Pulsation, for the same reason that the small ramifying Arteries have none, the Cause of the Blood being continual, for the course of the Blood being carried on by two Actions 1st that of the Heart drives it on and then the elastic coat of the Artery acts upon it.

The jugular veins appear to pulsate sometimes when there are Polypi in or near the Heart owing to the Bloods being impeded by them.

Not only Veins and Arteries, but all the Vessels in the Body are elastic and will bear stretching. — Thus our Constitution seems to require as our Bodies are liable to so many changes from fastings, overloadings, loss of Blood &c. By this Elasticity of them we are able to bear a greater or less quantity of Blood at one time than another, the Vessels always dilating and contracting so as

to

to accommodate themselves to the quantity of Blood thrown into them and therefore keeping the System compleatly full at all Times. — When at any time the Arteries and Veins have lost their elasticity, they are supposed to occasion palpatations of the Heart, sudden Death, faintings &c for when the quantity of Blood is small and the Vessels have so far lost their elasticity as not to be able to accommodate themselves to the Quantity.

The Case of Mr. Page is an Instance of this, he had been troubled with a palpetation of the Heart for several Years and was al= =ways releaved by a full meal, which kept the Arteries full by sup= =plying them with a fresh Quantity of nutritious particles, he made it a Rule to take a Dram when ever he found himself attacked with the Symtoms which always gave him ease, and he imagined prevented his fainting, and we may suppose it did by causeing an immediate ten= =sion and especially as he always found some relief from drinking any fluid for a while even water; and eating heartily and so taking up the Laxity of the Vessels occasioned by fasting.

It was easy to discover by his pulse when his Heart was affected and made it struggle, as he was ~~indeed~~ sensible of it him= =self. at length he died suddenly in one of those fits, and upon dissecting his Body it was found that the Coats of his Arteries had in a great measure lost their elasticity especially where the Aorta branches off to make the Iliacs, and seemed in general to have but little

Blood

Blood, which very well Accounts for the methods that gave him relief and gives a hint that swathing moderately light would have been of Service, vilent exercise has been of great use to such for a Time

Accordingly a Gentleman put off the Paroxysms by violent agitations and swinging the Arms about.

Of Blood-letting & Hæmorrhage

What will be the effect of Phlebotomy: Bellini says it flows fast out of the Body and with great Rapidity, then it does in the Veins in its natural Circulation, because the Blood that was necessary to propel the Column Between the Heart and Orifice is taken off.— Haller conforms this and saw by his Glasses that it Accelerated the Blood, and even produced a Retrograte motion as far as the Valves would permit; opening a Vein thus in any part increases the Circulation in that part except at the Time when the operation is performing and then it is slower.

Of Derivation & Revulsion

Bleeding in the diseased part increases the Celerity of

of the Blood in that part, and this is called Derivation to that part: as by that means the quantity of Blood in the opposite part of the Body is diminished, it is with Respect thereto called Revulsion from that part, thus Venesection in particular diseases is attended with very great advantages, thus from a pain in the Head Venesection is ordered in the feet: Hence the resistance in the feet being taken off more Blood is derived to the feet, but a Revulsion from the Head and if there is a Pleurisy in the right side we Bleed in the Left.

The method of stopping Haemorrhage

The Ancients made use of Ligatures on the Joints to stop Haemorrhages by abating the impetus of the Blood but the Moderns in Obstinate Haemorrhages of the Lungs, Nose, Uterus generally take away Blood from the Arm, which is commonly found to stop other Bleedings. — Doctr. Hunter prefers the Modern Practice to the Ancients. — Opening a Vein may stop Haemorrhage two ways — 1st by diminishing the quantity of Blood emptying the Vessels and lowering the force of Circulation, Sometimes producing a sudden faintyness, whereby the Vessels

Vessels collapse and stop the Haemorrhage. — 2dly By making a revelsion from that part. — The System being too full in general, the making ligatures on the Joints has its use when the Patient is very low, as it does not exhaust them so much as Phlebotomy does, but probably it has the same effect as Bleeding Viz. in causing a langour whereby the Blood coagulating stops the mouths of the bleeding vessels; and the Circulation will be as effectually abated, as if Venæ Section had been used; the ligatures should then be gradually loosned and taken off with ease.

Fainting is very benificial in flooding, and in all kinds of Haemorhages; in floodings for instance this is the way that Nature takes to releave herself, so that the very thing that seems to threaten the Patients Death, proves a Cure and it is very desire-able that these faintings should continue long for if the Patient of himself recovers soon or is relieved by Cordial, the flooding often returns

Floodings in the third Month of pregnancy would never be Mortal, if left to themselves, or very seldom, as we know of none dying in these circumstances and Administering Cordials in all such Cases is bad.

After Death there is but little Blood found in the Arteries and that is thick and Coagulated, in the Veins on the contrary we find more

Blood

Blood and that more fluid. — The Reason of this is the Elastic coats of the Arteries contract sometime after Death and Squeeze out the more fluid part into the veins, while the more Glutenous parts remain behind in the Arteries, there will be more Blood also in the Auricles than in the Ventricles — The Stopping of an Haemorrhage is occationed by a Contraction of the Vessel itself and by Clotted Blood Plugging up the Orifice. —

Dr. Haller recommends bleeding in all Cases of a Suffication as from Damps &c. As by thus putting the Blood in motion, while the Animal is warm he may a Chance to recover —

In Persons just drowned &c. rubbing up the Veins to excite the Blood into Motion has been frequently attended with Succes and I think inflating the Lungs might very probably have the same Effect. — Dr. Hunter is of opinion that the Arteries have some= =thing of a vermicular or Peristaltic motion like the Intestines, which serves to drive on the Blood in the Road of Circulation independent of the Power of the Heart; hence it is after death we cannot drive the Injec= =tions in quick by the Veins for the want of that power in them, tho we ex= =ert manefestly a greater force than the Heart, therefore we can never make the Injections flow in a full Stream into the Veins, this he cannot prove but thinks it probably from the following experiment

He open,d a Dog alive and let the Blood out of the mesenteric

Artery

Artery and injected Milk in the Artery, and it returned instant-
=ly by the corrisponding veins; but varying the experiment he open-
a vein & letting out the Blood, tied the Artery where it arose from a large
branch, and giving it time to empty itself, he injected by the Veins
but was not able to make the injection pass into the Artery. Nay
some of the Veins burst and upon cutting into the Gutt, he could
find no Tinge of the Milk, hence he thinks it probable the Arteries
have a peculiar vermicular motion, which assists in carrying on the
circulation in a living Body, but is lost in a Dead Body; dri-
=ving the Blood on in one direction but denying its Return tho
there mesenteric veins have no Valves.

Of the Muscles

A Muscle is a portion of red fibers that has the power of Contracting itself and is the instrument of motion A Muscle is generally oblong going from one Bone to another, tho not always commonly at each extremity there is a white substance called

Tendon

Tendon — The Structure of the Muscular part is manifestly made up of bundles of fibers running in the direction of the Mus= =cle, and connected by cellular membrane, the small constituent fibers are visable, but being collected they form Bundles, the quan= =tity of cellular membrane is in proportion to the intestices of the fibers

The appearance of the small constituent fibers is not much known because irregular when taken to Pieces - A Muscle has besides Cellu= =lar membrane (of which there are more on the out side than between the fibers) fat, more in some than in others (it being accidental) in order to allow free and easy motion, it has also Arteries, Veins, and Nerves, the Arteries have no uniform man= =ner of entering as those of some of the Viscera, Viz^t^ those of the Coronary & Hepatic, Emulgents of the Kidnies &^c^ Also there is brought more Blood to a Muscle than is necessary for its Nou= =rishment, which probably assists its motion, there is nothing remarkable in their Ramifications, they frequently anastomose when minutely injected it appears that a Muscle is almost wholly vascular, but the greatest number of the largest Vessels run in the interstices of those fibers tho some run across them —

From injection it appears that there is nothing remarkable in the Arrangements only the Branches grow smaller and often Anastomose — Doct^r^ Albinus say that the Arteries seem to

to Terminate in Muscular fibers, but as the Constituent fibers cannot be seen it is not easy to Conjecture the Reason of this ex=pression the Arteries are attended with Veins and Nerves which go into the muscular flesh in great Plenty, and there are more nerves in a Muscle according to its size, than any other part of the Body, also those which have the most action, have the most Nerves, as the muscles of the Eye &c. but the Heart seems an exception to this Rule, for tho it has the most action yet appears to have the fewest Nerves. ~ A Nerve when it enters a muscle is said to loose its Dura materal Coat but Dr Hunter thinks there is Reason to believe this. ~

Of Tendons of Muscles

A Tendon is a White strong substance of a Silver appearance and very compact, is smaller than the Muscle itself & much firmer and more tough &c. Tendons are fibrous and the threds composing them are united cellular membrane, tho but very little

and

and running in the direction of the Muscle, it is not red because
there are but few Vessels in it that carry red Blood tho it is Vas-
=cular all thro: and from a minute Injection the Vermillion
may be thrown into the Vessels, that do not naturally carry
red Blood — some Muscles have Tendons at both ends others
not, but are fixed without the intervention of a Tendon — The
fleshy and tendinous fibers are reckoned by Anatomists to be one
continued fiber, common both to fleshy and tendenous parts thro the
whole Muscle, this appearance is evident; they also say that it may be
conceived to be the fleshy part compacted into a Cord, also that the Tendons
gain on the fleshy part as they grow older and Doct.r Hally says a Man
has larger Tendons than a Boy in Proportion &c. There are many Instan-
=ces in the Human Body, where the Tendinous fibers do not seem
to run in the Directions of the fleshy ones. — Doct.r Hunter
thinks contrary to this opinion that the Proportion of the flesh and
Tendon is regular in growth in different Ages and he also thinks
the Tendon to be a different Substance or Chord on which the Muscle
acts and not the same Continuation of fibers thro the whole, the use
of the fleshy part is to shorten its length occasionally, and so become
the Instrument of Motion. — Let the Direction be as it will the
Arteries and Veins serve for its nourishment and there are more
than necessary for that purpose, therefore serve some other purpose

or

or is a concurreng Cause of its action but not the *Causa sine qua non* as Albinus says, the Nerves serve the same purpose as in other parts, as also to convey an Influance from the Brain — The Tendon never contracts, it is a Chord going from a Muscle to the part where it is to excite its action, and a Muscle may have a Tendon or not — A Tendon has but a small quantity of Nerves, contrary to the opinion of the Ancients, they are serviceable to hinder Joints from having but a small Degree of Motion and they make a smaller nap for if Muscles had been in the hand or fingers they would have been very bulky whereas being now on the forearm and sending down Tendons to the hand is very small and has a great variety of motions, for Ten=
=dons make more free, likewise when Muscles play round a Bone the Tough Substance of a Tendon is capable to bear the friction — In a healthfull state the Muscles are of a deep Red Colour, not inherent but is owing to the Blood in the Vessels. —

Of their Attachment

The large Muscles have large Tendons which seem

seen to pierce the substance of the Bone, the lesser tendons seem-
=ing to adhere to the periosteum, Cartilages, Membranes and even
fleshy parts. — Muscles fixed into small parts not only move, but
also alter their shape as in the Tongue. — Muscles are divided into —
three kinds viz:= Oblong Hollow & mixed. — Oblong as those of the ex=
=tremities in general which serve to bring the Parts nearer together
— Hallow as those of the Stomach, Heart and intestines the fibers
going round and round to demenish them, they surround and in ge=
=neral are expulsive. — The mixed are those of the Abdomen. —

The oblong are divided into Rectilinial (scarcely a true one in the Body) 2nd into half penny form like the feathers of a Quill split thro as the flexor pollicis longus. 3rd The compleat penny form as Gastrocnemius, or two or more of these together make a complex penny form as the Deltoid, and the radiate as the Pectoral muscles &c.

The rectilineal and penniform run nearly between Point and Point and have the same use, but in the radiated the action of the fibers is different. — Where flexion & extension only are requisd in the most simple actions the oblong will do, but where the ac=
=tion is complex it requires fibers in all directions, the advantage of the oblong directions of the fibers is that we can have a greater number in a given length of Mass; and absolute Strength is as the force of every single fiber that is exerted, hence will appear the

Disadvantage

Disadvantage of the rectilineal.

The disadvantage of the penniform is that they are shorter. — Where nature wanted to pull a great length she used the long or rectilineal, but where only a little and with greater strength, the penniform. — In general the fibers of Muscles are of the same length, that they may act together and have the same degree of contraction. In the radiated muscle this does not happen & for good Reason, some of them being to act singly. The Names given to particular parts are the one end called the Head beginning or **origin**, the fleshy part, the Belly and the other end the Tail or Insertion. — Winslow is for rejecting this Language, but speaks by the way of fixed or Attachment, and not head or Be=
=ginning, because the Head was said to be the part least moved, & the Tail that which was most so, but as both ends act upon the same occasions, he thinks it may be rejected to avoid mistakes.

Appendages of Muscles

Besides Tendons there are fascia, broad Tendi=
= rous

=rous aponeurotcal expansions to keep Parts in their Situation as froena and Annular Ligaments to keep Tendons in their proper places and so more properly belong to Tendons, likewise pulleys as a Cartelage for one of the Muscles of the Eye viz.t the Trochlearis or obliques internus, Bones are sometimes pulleys, also Sacculimus=
=cosi so called from Douglass their inventer, where there is friction be=
=tween the Parts to make motion free and easy. — Albinus calls them Buse tendineuses subjectae.

It is plain why Tendons are used instead of Processes of Bones, because first a Tendon is much Stronger in the same Bulk; 2.dly if a Bony process was to run across a Joint it would make it rigid, but Tendons allow a flexibility —

Some Muscles have always been called as they are at pre=
=sent, as the Diaphragm. — They had also numerical names but now have particular ones, from their use, and classed according to their Offices as of Respiration, flexion, extension and Rotation.

Lecture

Of the Lymphatics

Besides the Arteris and Veins, there is a third System of Vessels in the Body called **Absorbents or Lymphatics** They arise from the internal Surface of the Stomach Intestines and all the Cavities of the Body which Take up the fluids and mix them with the Blood — This is evident from Garlick, Mercury, Turpentine &c. on the external Surface of the Body; they will shew their Effect on the Blood from the Secretions which are made from it — If Milk or Water also, is injected into the Cavity of a living Animal, it will be as soon be absorbed: The Absorbents in the Intestines are called Lacteals from the Milky Liquor they Contain; and Lymphatics in all other parts. — The Lymphatics of Bartholine are probably only true Absorbents — One of the Lymphatics is a small slender Tube with its Coats somewhat like a Vein's and carries a watery Transparent fluid; it is furnished with a great many Valves, and runs from small to larger. — This sort of Vessels is found in all parts of the Body. — They Anastamoze as

as Veins do, pass the Lymphatic Glands and at last terminate in the Receptaculae Chyli and Thoracic Duct — The Spleen of a Calf seem to be almost entire Plexis of these Vessels where the Valves are: these are Enlargements so that they are painted like Bamboo Canes, but these Valves are not placed at such Regular distances as they are comanonly painted.

The Beginning of Lymphatics are imperceptable to us, we raise them by powring in Mercury, by blowing into the Arteries or Veins, by forcing Air into excretory Ducts, or even by Blowing into a Lymphatic Gland — They become Visable likewise by Putrefaction but Experiments do not shew us their Beginning: It was supposed they began from Arteries, but what seems to Contradict this Supposi=tion is, that we never can inject a Lymphatic by an Artery with=out Extravasation — Their Course is in general towards the Receptaculum Chyli, from all parts of the Body except those that termiate in the Thoracic duct — The Lymphatics from the lower Extreemities creep up to the Loins, in their Course pas=ing through the Lymphatic Glands into the Groin.

The Lymphatic Glands are placed in Cellural Mem=branes near Blood Vessels, and have a Lymphatic Vessel coming in and going out of them — They are generally hard roundish Bodies of the Conglomerate kind, some are larger then Others

Mr. J Hunter

Mr. J. Hunter found that he could raise a Lymphatic Vessel at any time by blowing into a Lymphatic Gland: He Went farther and found that by putting a pipe into a Lymphatic Gland he could fill the Vessel with Mercury from the Arm quite to the Thoracic Duct: he said that these Glands were Cellular, but Monsieur Michell, a celebrated Anatomist at Berlin, says that they are not Cellular, but a Branch of Branches of Lymphatic Vessels — The use of these Glands is not certainly known, some think that they are to Secret a liquor for the purpose of thinning the Lymph; others, a Liquor to thicken the Lymph and prevent its transuding so easyly —

Doctor Hunter imagines the Lymphatics to be of the same use as the Lacteals from the Analogy they bear to the them which last are acknowledged to be Absorbents. The Lacteals pass through the Lymphatic Glands in the Mesentery in the same manner as the Lymphatic Vessels: The Mesenteric Glands are particularly affected in Scrophulous Cases — some of the Lymphatics unite with the Lacteals and go with them to the Receptaculum Chyli; and some (for instance, those of the upper part of the Body) go into the Thoracic Duct some open into the it all the way as it goes up. Viz: those from the Legs &c. those from the left side of the Head and left Arm open into it near its and even into the Subclavian itself: those from the Right Side of the Head and right Arm go into the Right Subclavian

Subclavian Vein: And Mr. Michell Professor of Berlin says that those of the Stomach open into the Veins of that Viscus: They have Valves as the Lacteals have and are therefore qualified to absorb, as thereby the Lymph will be forced but one way only.

Doctor Hunter never injected the Lymphatics by the Arteries but an Extravasation as the Result. Then he concluded that they arose from Cells or Cavities in the Glands, but if the Artery burstet, the Injections gotten into them must be owing to their Absorbent Mouths opening into the Substance of the Glands — That they do absorb is evident from Rubbing Mercury into the Skin which Gets from thence into the Blood & frequently promotes Salivation — And that these Absorbents are Lymphatics appears from the Venereal Poison, if the Infection be Received at the Genitals, the first parts affected are the Lymphatic Glands in the Groin which are nearest, and a Bubo follows. — If the Infection is taken at the Mouth the Glands of the Neck are affected, and a Bubo is the Result; if at the hand or Breast, the Lymphatic Glands of the Axillæ are affected and swell — Thus the Lymphatic Glands are the Seats of Buboes. & the Veneral V is carried thither by the means of the absorbing Lymphatic Vessels — Scrophulous Disorders are generally Situated in the Lymphatic Glands, especially of the Mesentery — They begin in these and then affect the other parts of the Body

Doc: M Cawley

Doctr M.c Cawley in opening a Dead Body, cut his Finger, and some Poisonous fluid was absorbed by the Wound. The Lymphatic Vessels were swelled all along the surface of the Arm just under the Skin and a Red inflamed line extended from the Finger to the Lymphatic Gland of the Axilla which became much inflamed.

Upon the Whole Doctr Hunter thinks that Fluids do Transude all over the Body, not the Blood which is too thick, but a fine Fluid even in a living Subject, and that a Number of Lymphatic do absorb and return it again.

Lecture
Of Glands

Glands are Appendages of Arteries to Strain off particular parts from the Blood for Excretion and nourishment. They have their Name from their Resemblance to

an

an Acorn or Kernal: The Lymphatic Glands, as has already been observed, are the Seats of Scrophulous Diseases, especially those of the Chin and Neck &c: And hence it has been thought if the Tumor were the Ear, the parotid Glands would be affected - if under the lower Jaw, the Maxillary — But Doct.r Hunter says, as there are Salivary Glands, he never saw them affected in Scrophulous Cases notwith=standing he had opened many Bodies, who died of that Disorder:

The General opinion of a Gland is, that it is a circumscribed Ap=paratus of seperate parts abounding with Vessels; the office of which is to strain off a particular part of the Blood, as the Liver and Kidneys do to carry out the Liquor from the Body or Secrete for particular purposes within the Body.

The Liver being observed to be of a soft tender brittle substance, it was supposed that the smaller Bodies, or — Kernals were of the same kind and the larger being known to be Secretory Organs, it was concluded that the lesser were Straines of particular Juices - their Anatomical structure till of late, being little known: — The Ancients thought that the Interstices between the Tubes were made up of Coagulated Blood thrown out of the Vessels in form of a Parenchyma: In Malpighius's time this texture began to be inquired into: He examined Glands with Glasses and Injections of Ink in Diseased Bodies not being used till

till time for that purpose, from his Observations he established that a Gland was composed of a number of little Cells, that receive Juices which are there Retained &c — He also observed that there was a simple Gland or Follicle (as in the Throat) a little small Bag con=taining a fluid — All Glands, he imagined, were of the same kind He thought it might be proved from Anology that these Glands were conglomerate, which were at first Conglobate — He said a Conglobate Gland is when there is but one Cell or Follicle; a Con=glomerate, when many are Connected together but this Doctrine does not obtain now. — Likewise by injecting Kidneys, he thought he saw the Ink which he used for Injections in the Cells. — In the Diseased Liver, there is a granulated Appearance, being Studded as it were, with little white Bodies: those he supposed were distended with thick Bile which they could not throw off and so became Visible — This Doctrine was generally received and Ruysch was of the same opinion who in his hundred Cases mentioned, that the Glands of the Liver in a diseased State were Visible, for in that State, he saw little Bodies which he thought were the Follicles enlarged so as to be seen — But after he had used Injections he began to think they were Vascular without Cavities — He observed that as Vessels grew smaller, they became more tender, and all more in one part than in another, as in the Brain

Brain &c. — He thought the tender substance of the Liver all Vascular.

A Gland is composed first of an Artery, then a Secretory Vessel, which is only a Continuation of an Artery but of a smaller Diameter, then an excretory Duct, then a Vein which Returns to the Heart; it also has a Cellular Membrane Continuing the Parts, Lymphatics & Nerves: If we the Gland appears to be Composed of a Mass of Vessels without Extravasation as is seen by Examining with a Microscope — little Vessels are every where seen when Minutely injected, and Injections go a great way to let us into a knowledge of these parts — Ruysch says, a Gland is made up of Vessels, but after Injections, Interstices do remain in the Preperations; therefore it is possible there may be something else besides Vessels; as in the Preparations, the Interstices appear less in the Mesenteric Glands when injected: It is possible to give Summary Account of the different opinions — They are Vascular.

The Parenchyma, as the Ancients called it, was made up of an Effusion or Extravasation of Liquor, as Blood &c:

According to Malpighius it was follicular, and Ruysch allowed it to be organized and Vascular — This is highly probably.

Albinus says, that however Minute the Injections may be, Yet by glasses we may see some fine Points, not evidently Vessels, which we may either suppose to be Vessels or Follicles — According to Ruysch's and

and Malpighius Doctrine, it seemed most probable that they were Vascular too: From a very thin fluid thrown in, it may be proved that there is a Communication between the Arteries and Secretory Ducts; these being continued from the Arteries possibly in the same manner as the Veins are, with this difference, that they Carry only a particular part of the Blood, as the Liquor of the Glands is not pourd out into the Cells, but is continued in the Vessels, which are made from the Ar=
= teries and are called the Secretory Vessels: So that for Instance the Blood is brought into the Liver for Secretion, and the Secreted Bile is carried off by the Ducts; and the Blood (after Secretion) is carried off by the Veins, and thus there are as many Endings of the Arteries as there are Beginnings of the Veins and Ducts together — Ruysch also observes that a part of the Blood may be strained off without Glands as in the Pericardium, Thorax and Coats of the Abdomen which is done, as far as we know, by little Vessels opening into these without any Glands.

Doctor Nicholls endavoured to divide Glands into Cases, according to their inward Structure and Appearance, but there is such an universal Difference between Glands that they cannot be Ranked under heads — The Glands of the Body differ very much exter=
= nally and internally, as to the excretory Duct in different Animals, also in the same Animals at Different Ages, and with Respect to the

Vessels

Vessels that Receive the Liquor as Appendages — Thus the Kidneys different with Respect to the Bladder — The Vesiculæ Seminales with Respect to the Testicles, and some have no Reservoir, as the Salivary Glands — in others there are Ramifying Tubes as in the Breast: In some there is first a Samall Ramifycation, then large Branches, which at last make one Tube — In the Kidneys from very minute Branches there is formed a very large Reservoir, the Pelvis, which at last makes the Excretory Ducts — The Follicles of the Testes are also exceeding small and tortuous, and at last grow considerable larger as the

The Structure of all these Glands seem to be the best that could be, as in the Throat, The Follicles of Melphigius are Reservoirs that are always kept full of Slimy Mucus and cover the Bolus which we take in as food, and by that means render Deglutition easy — The Tonsils likewise are of the same kind, but are larger — Hence those lose their Glandular Flesh by Syphilis, swallows with Difficulty any thing Solid, as was the Case with a Man who after Eating was always obliged to have Wine or some Liquid, to take a little with every Mouthful he took.

Before we enter upon Secretions, it will not be amiss to observe, that there is not a Gland in the Body, with an Artery go= =ing to it larger than is necessary for its nourishment, and that there

is

is a Vein to Return the Blood, but not in every one a Secretory Ra=
=mifying Vessel as in the Testicles — It is allowed that it is the Ar=
=tery which bring the Blood for the Secretion, for in the Liver, if we
Inject the Vena Portarum which is their an Artery, we shall find the
Syringe in the Pore Biliarii, but without the Vermillion there be=
=ing here a Secretion performed in the Dead Body, and it seems also to
prove that these are continuations of Venæ Portæ: and therefore it
is likely all the Secretions are performed in this Manner and that
the Excretory Vessels are continuations of Arteries.

Of Secretions

One of the oldest Hypotheses is, That in the Paren=
=chymatous Substance, there are Pores of different Sizes and Configura=
=tions where the Blood being brought, rested as it were, these Pores
only allow the particular Particles to pass through them — To this
opinion

opinion the first objection is, that all smaller particles may pass which is of no great Consequence but the greatest one is, that from this Theory, the Glands might be often obstructed and become useless: and that it cannot be owing to Pores of different Configurations is Evi= dent, as the Shape is the same in all Glands — Another Opinion of the Chymists was that the Liquor was changed by a certain Leaven in the Glands originally placed there — This is a weak Hypothesis, for we can find no marks of any such Leaven, or aught that can change any Juice that comes in Contact with it — The only Argu= ment that can be advanced in favour of this Doctrine, is that any food, wether assescent or Putrescent will be converted into a Strong Acid by some Stomachs; but this probably may be owing to som other cause — If Bile was only made in the Liver by Leaven, The Jaundice would be incurible, the Leaven then being dispersed through the whole Body, nor could it be brought back again and Confined to its own Place: Where could this Leaven be formed: If at all, it, must have been in the Rudiments of every Young Ani= mal, and if it is consistent with reason to imagine that in the Ci= catricula of the Young Chick, where there is nothing but a Bag of clear Water, that the Duct are filled with Bile — Another Opinion exactly of the same nature is, that the Secratory Vessels were despsited Ab Origine with a portion of that fluid, which

wast

was afterwards to be seperated, as Gall in the Secretory
Vessels of the Liver, and that the same particles of fluid
attract and repel each other — This Gall in the Secretory
Vessels may attract Gall from the Blood, whilst it repels
such particles as those of a dissimelar heterogenes Nature:
On this Principle they say Secretion on Surfaces may
happen with Glanduler Substances — This they illustriate
with Oil and water mixed and Strained through a paper,
which being porous, the Water transudes and attracts all
the watery Particles, the Oil remaining behind — If we
attend to the formation of Animals we shall be convinced
that this Hypothesis will not hold — Hence in the Chick,
which in the beginning is very small, the Body appears first
afterwards the Blood but not the Bile for some time, and
if it were the Jaundice could not be cured, because the Bile be-
ing thrown into the Mass of Blood, it would attract particles
similar to itself and so would always remain — The Most pre-
vailing and probable Opinion is, that it depends upon the Diffe-
rent Diameters or Sizes of the Vessels; for there are Vessels that
will admit Globules of a Certain Size is beyond all Doubt, for
we see in Injecting the Liver in the Dead Body, that they are

filled

filled with Syniglass but the Vermillion will not pass.
if the Secretory Vessels were to secrete only the smaller
sized Particles — They would be of the first order to per-
=form Secretion or the second, the Vessel would receive the
Fluid of that order: and on their Size. Suppose Vessels to
take up particles of the smallest Size, and many other Cir-
=cumstances may compare with this Principle, that is, there
may be many assisting Powers of Secretions, as Attraction between
the fluids, also between the Coats of the Vessels and Fluids to
be secreted also the different Axies of an Artery going to a Gland
not that we can see such a thing in the Blood, nor perhaps much
Reason to believe, than any part of it gravitates much to the Sides
of the Vessels &c — Yet it hold good in Hydrostatics, that the hea-
=viest part of the fluid, tho its motion be Quick, will gravitate to the
Sides &c of the Vessels — Doctor Martin says that Secretion cannot de-
=pend upon the Capacities of the Vessels, because the Secretion is the same
in old as in Young, in small as in large Arteries — for says he, can
we suppose that the Secretory Vessels are of the same Size in the Man
as in the Child, the Elephant the Mouse, and yet that they could
strain the same kind of Liquor at all times of life? But we are
sure that there is not the same proportion of Glands, Growth, Extention

in all

in all parts of the Body, as the Head and the Liver of a Fœtus are much larger in proportion than those of a grown Person — Also one Vessel of the Body, Viz.t the Chrystalline Capsulæ of the Eye we know may be injected at six months, but not when a Child is Born at Eight Months old which is than too minute —

It is probable that Secretory Vessels may be very easily formed and not afterwards enlarged with the Growth of the Animal — Further the Arteries in different parts are of a different texture, the Secretory Vessels may be so likewise many things may effect Secretion, as in the Liver, the Blood brought by the Venæ portarum, is supposed to come smooth from the Bowels and prepared for the Secretion of Bile as Phisiologists say — Also from the Nature of the Aliment, the Secretion will be Effected, and it may be assisted or altered by the Reservoir, as in the Bladder of Urine the more Watery part is taken up, and Oily, earthy, excrementious is thrown off — and something in life is necessary to assist Secretion, therefore after Death it is not to be imitated.

There are four different Stages in the Process of Secretion Viz.t 1.st A Preparation of the Blood, as that from which is Secreted the Gall, undergoes a Preparation by passing thro the Abdominal Viscera; and it is said that the Blood

in the

in the Portæ is bitter before it goes into the Liver 2ndly
The actual Seperation made in the Secretory Vessels
by their different Dimensions. 3rdly An Absoption of
these wet parts or an Addition of something to the Secreted
fluid 4thly The Exerction out of the Body as from the Urinary
Bladder, or the Expression from the Reservoir to the part where
it is wanted or the Resumption of it into the Body — Some
Secretions being only wanted occationally as the Semen &c —
Also the Milk in the Breast if not drawn becomes troublesome
on the third day and it some times Spontaniously Runs out,
and at others it is returned into the Blood, probable being
absorbed by the Lymphatics — As the Bile is brought
thro into the Gall Bladder & Watery, we may suppose
that the thin parts are absorbed there, and the Bile itself
thus seperated by Stagnation — This is evident in the
Follicles of the Throat, where a Mucas is necessary. The
Fluid is strained into them by a number of small Glands
surrounding them, and then by a Stagnation become
thicker, nor is it unlikely that all the Secretion of the
Body may be taken ups and conveyed into the Blood

The following may be looked upon as Axioms

Relative

Relative to Secretion 1st That Secretions are carried on constantly and equally in a given time when the Circulation is not not disturbed; because the Heart acting Regularly, the Blood goes to all parts, and the Strainers being Continuations of the Arteries, the Secretion goes on - 2d Which is an Exception to the first, some Secretions are increased and performed, when wanted as Milk in lying in Women &c. - 3d Others are occasionally increased, as the Saliva for Mastication. 4th In proportion as one Secretion is increased, another in diminished, and this helps to keep up the Ba=
=lance of Circulation - 5th Irritation from external things affects the Secretions, as external Irritations on the Eye cause Tears - 6th Irritations of the Mind affect Secretions for as oft as we see a sore Eye, our Tears flow - The Secretion of Urine is increased in Hysteric Peo=
=ple that of the Semen by thoughts & that of Saliva by Hunger - 7th Medicine increase some Secretions, according to some Mercury is of this kind, it increases Secretions sometimes one way and sometimes another as by Sweat, Urine, or Saliva - 8
Also there are those which affect a particular Secretion, a Diuretics &c - Doctor Lee says it is principle for a Physician to attend to the Secretions, or according to his expression to turn the Balance of them by in=
=creasing one, while another is diminished.

Of the Nerves

The Nerves are whitish Cords arising from the Brain and Spinal Marrow, in pairs and pass in Ramifications all over the Body: As the manner in which they perform their functions is a Matter little understood

The Brain is covered by the Dura Mater external= =ly but more immediately by the Pia Mater — The Dura Mater is a strong white, tendenous Membrane of a glittering Silver colour: The Pia Mater is a very Vascular fine Membrane with a great number of processes — The Tunica Arachnoides is seen in some parts without Vessels, between the dura and pia Mater — This however is a particular covering only and seldom to be found any

any where but at the Basis of the Skull and Medulla Oblongata.

The substance of the Brain is divided into Cerebrum and Cerebellum and medulla Oblongata which is continued into the Back Bone and forms the Medulla Spinalis: The substance of the Brain is tender, its external part is called its Cortex, or Cineritious substance, and the internal the Medulla — The mass of the Brain has been generally considered as a Gland, and it was supposed that there was a great Analogy between it & the Kidneys — Its Cortical part was said to be the Strain=er, and its medullary, a number of very small Ducts, but they could not discover any larger Duct as it might be expected so large a part would have a very considerable one — The Origin of the Nerves is chiefly from the Medulla Oblongata and Spinalis Each Nerve has a par=ticular covering from the Pia Mater: they are so

blended

blended and difcusate each other in such a manner that the beginning or Course of the small Nerves cannot be trac=ed far on this Account.

Aurelius's Doctrine of the Decussation of the Nerves is still kept up, Viz^t that the Nerves which arise on the right Side of the Brain, pass to the Left side of the Body and Vice Versa — This opinion seems to be well supported by Pathological Observations; thus when the Right Side of the Brain has been injuried, the Left side of the Body is affected and Contrariwise — When they Emerge from the Brain they take its Coats, as first the pia Mater covers them before they get a particular Coat; when they pass on through the Dura Mater they carry a Por=tion of that Coat with them which likewise Sheaths them. — This internal Coat gives them their firmness & Strength — The internal Substance being probably the same as that of the Brain.

Nerves are inelastic, or nearly so, as from Expe=riment

=riment it is proven; for after having cut out a living Animal
part of an Artery, Vein and Nerve, and laying them on a Table,
it was observed that the Artery and Vein Shrunk considerably
but the Nerve none at all — All the larger Nerves appear
to be made up of smaller ones except the Optic Nerve
which appears to be made up of the same Medullary Sub=
=stance as the Brain, only becoming more & more firm
as it comes nearer to the Eye Ball — The smallest —
Nerves are probably invisable, as the smallest which
we see with Glasses appear to be compound of still small=
=er ones — The Universal Communication of Nerves de=
=stroys the Doctrine of Sympathy, as the Intercostal Nerve
communicates with almost every other in the Body, by
this we Mean that some Parts of the Body seem to be
particularly affected by a kind of Sympathy with other
Parts thus the Nerves of the Nose being tickled affect
the Organs of Respiration and cause Sneezing. Physiologists
accounted for this from the Communication of Nerves, but
this

this seem insufficient as the constituent Nerves are always distinct Doctr. A opposes this Doctrine of Sympathy, and endavours to prove that it depends on the Juxta Position of the Nerves: In the Brain itself, the Course of the Nerve is nearly the same as those of the blood Vessels, tho' there are a Number of Exceptions at least it is as much so as their Origin will admit, the one arriseing from the Heart, the other from the Brain — As in the Arm, the Nerves run down from the Head, the Blood Ves= =sels run up: So likewise also in the Legs & Thighs, tho' they are first at a distance, the one being before, the other behind; yet at the Ham they meet together & so go on — There is a great Variety in the Distribution of the Blood Vessels, but that of the Nerves is always the same or much more uniform: Nerves give off Branches as much as Blood Vessels do, and when a Vein or Artery goes off a Nerve generally attends — A Nerve being a bundle of small ones is no more than a large Bundle sending off

off part of which it is composed — Nerves also Commu=
=nicate, and then two small Bundles are made into one,
if their frequent Union or Anastamosing is called their
Plexus which is sometimes amongst the larger, but
oftner among the smaller: These Plexuses are not to be sepe=
=rated, because the small constituent Nerves become so much
blended and entangled: Arteries and Veins go to the
Viscera nearly in the same Manner, as to the other parts,
but the Nerves are disposed also after the same manner of
Plexus upon the Liver, Lungs, Kindeys &c. and each Plex=
=us has its Name from the first to which it goes as the
and where the large Trunks meet
and form a Plexus, the smaller Filaments decussate each
other: This makes it difficult to dissect them, and
moreover, we have not any tolerable good figure of them.
There is no Instance of a large Nerve going to any of
the Viscera or Viscus.

Of natural Ganglions

There are sometimes little knots in Nerves called Ganglions or swellings of the Nerves their Figure are different and they are in a great number in the intercostal Nerves and opposite to every Vertabra; some are round and some are long at this place the substance of the Nerve seems to be changed being softer and more red — The first cervical Ganglion of the of the intercostal Nerves is the largest Nerve of the whole Body — Ganglions are found where Nerves give off their Branches —

An Anatomical Ganglion is a knot or Swelling upon a Nerve but a Surgical Ganglion or what is commonly called Ganglion in Surgery is a Swelling of a Tendon — Lancisi says they are swellings of the muscular Fibers and

and calls them corrcle or little hearts which he thinks by contracting stop the nervous Influence & overrule it therefore Ganglions are not in Nerves going to the Organs of Sense as the Eye. Ear &c as they must be always ready to receive Impressions and such an Operates in them would be needless, but only as such as go to Muscles — Others thought that every Ganglion was an Additamentum to the Brain producing nervous Filaments — A French Author thought from the appearance after Amputation that they were owing to pressure and Inflamation, but we must allow that natural Ganglions are very different because they lie out of the Reach of Pressure in many places — Also in Young Fœtuses Ganglions appear to be irregularly formed — It does not appear the true and natural use of Ganglions is rightly understood —

The formation of Nerves is but little understood in Comparison to that of Arteries and Veins, because the latter may be Injected and the former cannot, allowing them to be the Instruments of Sensation. We may conclude that they termenate in every

every part of the Body however minute — It is a common opinion that Nerves before the terminate drop their Coats and end in a soft Pulpy Substance, They give no further Proof of this otherwise then Reasoning from analogy — But it appears from Dissections that this is not really the Case. —

Of the use of the Nerves they are found to be communi=
=cating Instruments between the mind and the Body, the Actuating Principle of the Corporal Substance — The mind receives from them ~~the~~ information of what is transacted in the Body and like=
=wise Sensations from external Objects they are Rulers and Manag=
=ers of Muscular Motion carry the influence of the Land produces an Action in the Muscles, more distinctly in some then in others. To them are owing those universal Sensations different through the whole Body and their distinct Sensations in the different parts of the Body gives notice of approaching danger and in short they are the Instruments by which the mind operates upon the Body and is operated upon — We may here take notice that whenever the external parts of the Body are

affected

affected with pain &c. we may easily point out the place where it is situated' — This seem to be owing in a great measure, to our being assisted by our Sight in making the enquiry and a perfect knowledge of the form and situation of the external surface of the Body, so that we can tell instantly what part is affected, but when the pain is more deep seated, suppose in some of the viscera we cannot exactly point out the place and extent of the Pain — This can only be owing to our being unaccustomed to see and handle these parts not being exposed to the nerves so that our knowledge in the former particular must be only the Result of Experience and observation and we learn by Practice a distinct command of the Muscles.

Of the Action of the Nerves.

From Experiments the following Phenomena have been Observed — 1st That if a Nerve

Nerve going to any Part be destroyed the part loses its
Sensation, or if the Nerve be only compressed for any Time
as in the Hip, or that part of the Condyle of the os humeri,
over which the Nerve passes that goes to the little Finger
which Observation Occurs Daily. Some have supposed the
residence of the Mind to be the Nervous System, all over the
Body. But this Doctrine is liable to many exceptions.
it more probably is in the Brain, which is called the
Sensorium Commune, because when the
lower parts are paralytic, the seat of the Mind is not De-
stroyed — 2ly Besides if the Nerves that go to any part
be cut through or the whole part be cut off, the like Sensation
shall be felt for a time as before as sometimes happens
after the loss of a Limb &c. 3ly If also the Brain or Spi-
nal Marrow be Destroyed to a certain degree, the Nerves
arising from thence will become incapable of performing
their Office. Persons may lose considerable parts of their
Brain and yet live after it — But if we cut a Nerve
going

going to any principle Vital part, we destroy Life immediately — Hence the reason why running an Awl or any Instrument of that kind into the Spinal Marrow very near the Heart occasions sudden Death — 4th As the distension of Nerves produces Palsies & Irritations of them produces Convulsions. An Arm or any other Part is said to be liable to two kinds of Palsy besides loss of Sensation And Motion together — Motion may be lost and Sensation remain distinct and Vice Versa, if this be the Case, it seems to prove that there are one Set of Nerves to perform Sensation and another to perform Muscular Motion — A Question arises here, in what manner are Sensations performed? This is not know and perhaps never will be — Some suppose they are produced by Vibration, the Constituent Nerves being Solid Cords and Imagine when they Convey the Influence of the Mind to the Muscles the Vibration begins in their Origin, being produced from, or in Brain by the Mind — But in Conveying Sensations

to

to the Brain it is Vibrated from without and that the Vi=
bration Motion of the Nerves was the most likely method to
to account for the Sympathy of Parts — It may be ob=
=jected then, of what use is the Brain? But it may be said in
Answer to this to be necessary for the residence of the Mind —
Mr. Jno. Hunter observes that the Mind is not affected by Acids
nor has it Earth as other parts have — The Objections are the un=
fitness of the Extremities of the Nerves to receive vibratory Motion
as they Terminate in Soft, pulpy Substances — but there is not
no proof of this tho it is that they end in Soft tender Substances,
their Course is usefull, for this purpose; they are soft likewise lie in
Contact with other parts and are not tense — The lengthening
or relaxing a Nerve has no effect on Sensation there are diffe=
=rent degrees of Sensation by the same Nerve which therefore
must require different degrees of Vibration — Also many
Nerves lying in one Chord if they convey different Sensations
affect each other and cause a confused Sensation or Sense —
Another Opinion is that they are hallow and convey a fine fluid

and

and the Brain being supposed Glandular from its similarity to the Kindneys, it was concluded that the Nerves were excre= =etory Ducts — The following experiments were made and supposed to Confirm this Theory: On compressing the Phrenic Nerve of a living Dog the diaphragm became Parylytic; if this Nerve be stroked downwards it acts a little and being taken hold of higher up it again acts a little by stroking downwards — An Objection to this Doctrine is that the mo= =tion of this fluid in the Extream Branches of the Nerves could be but very slow too much so, to answer the Quickness of Sensa= =tion — To this it was said that when the mind willed by giving an impulse at the Beginning, there was an undulation through the whole — The Nerves are supposed to be full of a Nervous fluid a Sense — immediately communicate to the other end, and the same also happened in returning Sensations to the Mind — The Experiment did, at first seem very plausable, but after making repeated Trials, it appears that if the Nerves be compressed, so as entirely to take off the nervous Influence,

Stripping

Stripping them will have no Effect — Also if the Pressure upon the Nerves
less considerable Stripping the Nerve upwards above the pressure will have
the same Effect as below, which is entirely against the Argument and it is
proof, that it is irritation on the Nerves which produces this Effect.

In Osteology we divide the Body into
three Parts Viz.t Head, Trunk and Extremities
The Trunk of a Skeliton, we subdivided into the Spine, Thorax
and Pelvis but in a fresh Subject we divide the Trunk differently
Viz.t into Thorax and Abdomen or upper and lower Belly — The
Viscera of the Thorax are only the Heart and Lungs and there-
= fore not necessary to be subdivided — The Abdomen is seperated
from the Thorax by the Diaphragm.

The

The Abdomen by Reason of its largness and the many viscera contained therein has been divided into several parts by imaginary Lines. for the Readier knowing the particular Situation of each viscus — The Divisions are as follows. 1st That which lies under the Cartigo Xiphoides called Scrobiculus Cordis — 2nd From the Scrobiculus Cordis down to within 2 or 3 Inches of the Navel is called Regio Ephigastrica — 3d Circumscribed and on each Side of the Ephigastric Region are the Regions Hyphochondriacæ — 4th For two or three Inches below the umbilicus circumscrib- -ed is the Regio umbolicales — 5 And on the posterior Parts are the Loins containing the Kidnies called Regions Lum- -bares — 6th From these to the Os Pubis is the Hypogastric Region — 7th on each Side are the Iliac Regions & 8th At the inferior Part is the Region Pubis — As we are sometimes called to open the Body of a Deceased Person in the presence of his friends, particularly if he Died a Violent Death, we should endavour to do it with Regularity and Decency —

The

The Ancients open'd the Abdomen by beginning at the Sternum and directing the knife along the False Ribs to the Loins — then along the Spine of the ileum to the Os Pubis and laying the loose part over on the contrary side — Others began at the Ensiform Cartilage and made a straight incision down to the umbilicus. then dividing the incision directing one to the Spine of the right and the other to the Left Ilium and turning each part back. But the best method is to begin at the Ensiform Cartilage and going straight down to the ossa Pubis and then another transverse from the umbelicus to the Loins each way.

The Thorax is opend by taking off the integuments and cutting the cartilages by the Sternum — This methodical division of the Thorax and Abdomen was thought very necessary for determining the situation of the contained Parts It may be necessary to understand the situation and connection of Parts in the various positions of the Body — In a supine Posture the Viscera get up into the Chest and the Abdomen

becomes

becomes flat. These cavities are filled with viscera, the parts
pressing against one another and keeping pace with each other
as in Inspiration & Expiration — Form the connection of these
parts, when any one part is affected, it will be difficult to de-
-termine the exact part. Hence from Sympathy & Contiguity the
disease spreads and the Symptoms are blended and by this
means become puzzling even tho it be of the utmost conse-
-quence to determine the seat of the disease. This arises from
a change of situation height and whole Column of
Viscera from change of posture and from some parts
being more apt to change their change than others.

Of the Chest The Pleura is a fine thin
Membrane adhering every where to the Ribs and entercostal Mus-
-cles united by cellular Membrane when this is cut through you
into the cavity of the Chest — The Lungs are on each side
and behind with the Heart in the middle and these parts
tho in contact are loose upon one another with the Diaphragm
convex above and concave below — The cavity of the Chest

is

is double right and left without any communication with one another being divided by the Mediastinum nearly in the middle, but rather to the left.

The Mediastinum is formed by the Pleura being a dupplicature of that membrane like the Peritonæum — It is reflected from one part to another making a Compet Bag on each side so that it covers the Lungs first by Adhesion and then loosely where it is connected to the Ribs so that Water cannot get out, but by transudation, there being no communication behind nor before for there is just such a membrane at those places with this difference, that the posterior Mediastium on the upper Part, when partly divided from the Sternum have the appearance of a Cavity, tho there is in reality no such thing, it being no more than the Membrane going backwards on each side from the part where the lamella being joind by cellular Membrane form the Mediastium — The Lungs are placed on the right and left sides going far back on each side and when inflated take on the figure of the Cavity of the Chest and surround the heart they are convex externally & concave internally where they respect the Diaphragon.

The

The Lungs are every where loose except at their Roots from whence the Blood vessels, as from a Center, run into them & ramify through their Substance — The Lungs fill up the sides of the Chest — The Heart and Blood vessels are fixed to these parts by means of the connection of the Pleura with these parts & the Diaphragm

But at the place of this Connection the Diaphragm moves but little and the Cavity goes down much farther than on the fore part — In all the Cavities of the Body where one part moves upon another their Surface is covered by an investive Membrane as the pleura is in the Chest — This gives a smooth Surface and as a continued Membrane it confines a lubricating fluid in its Cavity — Hence the Cavities are liable to a discharge of fluids — The pleura also performs the office of a Ligament — Why are there two pleura? Because if they Communicated with one another a Wound on the one side must have destroyd Respiration as the Lungs must collaps from the pressure of the Atmosphere

The Heart is placed in its pericardium between the Lungs of the right and left side, in that part where the Capacity of the Chest is most narrow with the above Pericardium that are going to the Superior parts and Aspera Arteria coming down — The Pericardium is fixed to the Diaphragm on both Sides.

To

To the upper part of the Pericardium is internally united the Diaphragm
The Heart lies with its Apex to the left side. The whole mass is nearly in the middle of the Body — It is fixed at its Basis by the Vessels The flat side of the Heart lies close on the Diaphragm — The Axis of the Heart is directed forward and to the left side obliquely — The Apex and Body of the pericardium are loose but are fixed at the Root of the great vessels — In the Pericardium may be considered three different lamella The internal and external may be perceived distinct — The External is a continuation of the Pleura within which the Phrenic Nerve runs down with an Artery and Vein — The Pericardium is a reflected Membrane investing the Heart itself and thence going off over the Vessels. is reflected over the Heat — On the inside the Membrane being Reflected from the contained to the Containing Parts — Besides these two there is a third, which is a dense or ligamentous cellular Membrane

USE The investing Membrane is the same as the Pleura, as the heart has Motion, it makes it smooth and retains the Liquor. also being fixed to the Diaphragm, it keeps the Heat secure to its proper place and prevents the Vessels from being twisted — It may also be considered as a Ligament that prevents the Diaphragm from descending too low which from the attachment

of

of the Vena Cava could have lengthened the Vessels and interupted the Column of the Blood — The Pleura was Supposed to be the Seat of the Pleurisy, tho' the neighbouring parts must partake of the disease as the intercostal Muscles &c. —

Of the Pancreas & Chylopoietic Canals

The Pancreas is an Oblong Body, one end fixed to the Spleen thence going across the Body the other end terminates Duodenum coming down before the right Kidney.

From the Mouth to the Anus is one continued ca-
=nal, 1st the Pharynx, then the Oesophagus which begins about the cricoid Cartilage and passing down before the Spine, gets through the Diaphragm to form the Stomach — The texture of the whole Canal is nearly similar in all parts — In the Oesophagus there is no Coat from the Pleura, for this membrane touches but a small

Portion

portion of it — It runs in a cellula membrane which is not a proper Coat — The first proper coat is muscular which is very strong and consists of two planes of fibers longitudinal and circular which are a very strong under the muscular Coat lies what is called the Cellar Coat which is nothing more than cellular Membrane which connects the internal Membrane with the muscular Coat The Cellular Membrane being of some considerable Thickness a g^r^ was called Nervous but now Cellular.

Use of the Oesophagus Is a Muscular pipe for conveying food to the Stomach swallowing is performed by a Successive contraction and pulling down all the way It is quick but may be observed and followed especially when swallowing is difficult Drink is not poured down by its gravity but like a bolus is thrust down by muscular contraction This is evident in a Horse that Drinks, hence the use of the muscular Coat

Boerhaave gives an Instance Oesophagus was torn quite through upon taking a Vomit Dr. Hunter met

met with a Case, where after a Violent vomiting the Oesopha=
gus was Slit.

Stricture is one of the worst diseases that the Esophagus is Subject to — In some it comes on gradually in others more gradually in others more suddenly — They swallow Solids with difficulty in some most in others less, at last they are starved — This generally happens from a Callous Stricture of the Oesophagus with Ulce=ration — In a Case that Mr. Watson attended an Ulcerated Stricture closed up the Oesophagus so much that a probe could scarcely pass — This was supposed to happen from the large Lymphatic Gland described Vesalius being affected — And the disease of the Oesophagus in general proceeds from a Callous Stricture on the underside of the Liver the Gall Bladder proceeds, at the fissure are the Vessels going to the Liver to the Gall Bladder the Cystic Duct goes downwards from the Liver the Hepatic Duct these two uniting form the ductus com=munis Choledochus which last pressing behind the beginning of the duodenum gets to the head of the Pancreas and opens into the Pancreatic Duct just before it empties into the Duadenum

so that the one Duct conveys both the Bile and Pancratic Juice into the Duadenum.

The Duadenum makes various Turns from the beginning to the end — In the Course of the Duadenum, rather on the left side is the Pancreas; leaving Room also for the passage of the mesenteric vessels, between the Transverse Mesocolon and Pancreas. The Artery comes from the Aorta at the Loins — The Mesentere vessels collecting go up and taking Branches from the Splenic and those of the Stomach from the vena portarum which are different from any other veins of the Body resembling the Root, Trunk and Branches of a Tree — The Roots being Veins collecting Blood from the Intestines and the Branches are distributed to all the parts of the Liver and make its great Vein It performs the Office of an Artery, called Vena Portarum

Hepatica — Above the concave part of the Duadenum opposite to the part where the Pancreas is united to it we observe the Pancreatic Duct

Of

Of the Male Parts of Generation

These are the Spermatic Chord, Testis, Scrotum Vesicæ seminalis Prostate Gland & Penis.

The Spermatic Chord is composed of the Spermatic Artery and Vein, a nerve, Lymphatic and vas deferens all included in a cellular Coat and some have supposed a Muscular which they have called Cremarter — It is not visable except where it passes out of the Abdomen, which it does in an oblique manner through the Rings of the Obliquus externus muscle by which the entestines and Omentum sometimes fall through, forming an Hernia Inguinalis or Scrotalis along the side of the Spermatic Cord.

The Vasa deferentia employ themselves somewhat like the Billary Ducts there being a Passage immediately from them to the urethra, but it commonly regurgitates into the Vesiculæ Seminalis & is there kept till used.

Vesiculæ

Vesiculæ Seminalis are two Glands situate under the Neck of the Bladder composed of little Cells which communicate with each other being reservoirs for the Semen.

From each of these goes a small Duct, which opens into the urethra at the *Caput Gallinaginis*, where is a large Gland called the proftate Gland, which secrets a fine Mucus to defend the Urethra from the Acrimony of the urine

The Scrotum is composed of Skin, Cellular Membrane &c: next to which has been reckoned a Muscle called *Dartos* which is not to be discerned and the first obvious Coat is that which surrounds the Testicle much as the Pleura or Peritoneum does the Contents within them. This is called the *Tunica vaginalis propria Testis* and within that is a Coat which adheres to the Substance of the Testicle called *Tunica albuginea* — The Substance of the Testicle is Wholly Glandular — The Spermatic Artery entering in at the side of the same and distributed thro the

same

same terminating in fine Excretory Ducts and these again in Excretory ones which uniting into one form the *Vas deferens* The Epididimus is an appendage to the Testicle form,d by numerous Convolutions of the Excretory Duct reckoned six times as big as the Spermatic Chord.

Of Cellular Membrane & Fat.

The cellular Membrane is of two Species, one Adipose where there Fat &c: Another Reticular where there is no fat. it is a composition of Membrane and Fibers of net-work curiously Interwoven. the Cells communicating freely — It is Vascular but free of the Vessels that carry red Blood hence it appears white and has nervous Filamenta — Its Structure is of the smallest constituent fibrous Particles.

It

It is supposed by Doctr Hunter that the Cellular Mem-
= brane is an organized concretion with vessels running upon it
certainly there are Stamina in the Body which are inorganized
(But they are much smaller than we can see) Earth is the Basis
of all our Solids, which is kept together by an Animal Glue thus
being forced off by any means, the Earth crumbles — By Papins
Digester, which deprives Bones of their Glue a considerable Quan-
= tity of which, we shall obtain therein or if the Body be burnt,
the particles become brittle and loose their Adhesion. —

Doctr Haller thinks the substance of Adhesion
to inorganic and that a gelatinous concreting substance be-
= comes Membranous — Doctr Hunter thinks that all
Parts wether natural or from Disease are Vascular as Adhesion
callus, cicatrices appears to be Vascular from Injections —
A cicatrix or callus is a shooting out or lengthning of the
Vessels Arteries and Veins anastamosing in a particular Man-
= ner not to be accounted for — It is indeed surprizing that
new parts of the Body should be produced by elongation

of

of the Vessels — The Shooting of Tubes appear very unac=
=countable and not to be imitated by any human Inven=
=tion and yet it is no more surprising than that a Plant
should shoot into Tubes or that Salts should shoot in so
irregular a Manner as they do.

Of the extent or Situation of

cellular Membrane. Cellular Membrane is found all over the Body or in very few exceptions. It is in the greatest quantity where the interstices are largest and vice Versa. It is cellular Membrane that binds all parts together and where parts are connected; it is by cellular Membranes when it covers Muscles it is called Membrana Communis musculorum tho there is no occasion for such a distinction, as it is cellular Membrane still it has by some been reckoned among the integuments The only parts where it is not dispersed are those which are loose as the Bowels &c: It is not found in the humours of the Eyes but the Vessels which run into the

Bones

Bones appear to have cellular Membrane and perhaps
also the Compacts of the Bones.

The Cellular Membrane may be inflated all over
the Body, as Butchers do their Meat The air gives it a
Whiteness and thickness — An Anasarca arises
from the loose Texture of the Cellular Membrane being load=
=ed with Water whether from the fault of the absorbing Vessels,
too great thinness of the Blood, or too plentifull Secretion, is
not known but most probably it arises from Excudation —
The Legs are most are most affected when the person has been
standing, because there is a free communication from Cell
to Cell and the Water by its gravety presses downwards which
is evident, from thence it may be discharged by Scarifica=
=tions which need not be very large. Blisters also empty off
the Water: first by cutaneous Vessels, then by Soakeing through
the Skin which be porous, the Water passes off by transu=
dation — Effusions of Blood into the cellular Membrane

Proves

Proves also the communication between the Cells, as on the outside of the Eye, or from a Blow on any Part of the Body where the Vessels are Broken or the Blood Effused with the Skin unhurt. likewise it is evident from a Thrombus or Extravasation of Blood into the cellular Membrane near to the Orrifice of the punctured vein ~ In Aneurisms the Artery being Wounded, the Blood gets into the cellular Membrane and sometimes spreads very soon allover a very large Surface of the Body ~ The late Duke of Grafton had a Vessel broken in his head, by a fall from his Horse and the Blood ran along the cellular Membrane, in a Day or two, allover his Neck and Chest, which parts were quite Black, as if they were Mortified, and had a dreadful Appearance ~ The cellular Membrane may be inflated, by an Emphysema even in a living Animal and that by two causes external and internal: 1st From Wounds Lacerations or Ruptures of the parts Subservent to Respiration, 2nd from a Rupture in the Trachea by an

Ulcer

Ulcer in a Consumptive or from a Rib puncturing the Lungs

— The Emphysematous Tumor is distinguished in any part by its Sound when Struck with the hand and a peculiar Cracking of the Air, on its being more easily push=
=ed away than Water.

Emphysema from an internal Cause is very hazardous, as from a Rupture of the Trachea &c. but from an external cause is not attended with so much Dan=
ger — A remarkable Case happened to a Person whom Doctr. Hunter was called to attend the whole Body except his hands & feet was Emphysematous from a fall off his Horse but what was a happy Circumstance, there was but little Emphysema internally, the parts were so swell,d that the Human form seem,d quite destroy,d his Eyes were closed, the Skin greatly stretched, and he panted for want of Breath The swelling was first pres,d from his Eyes whereby he was a small incision being then made, the

Air

Air bush,d out in a Blast, if this had not succeeded Doct.r Hunter intended to open the Cavity if necessary, where the Wound first happened —

2.nd " Putrefaction often causes an Em = = physema for if flesh be thrown into the Water it first sinks but after sometime rises again to the Top: from this it is that drowned Persons after sometime rise again to the Surface — Putrefaction or something like it produces an Emphysema in living Bodies and mostly in hot Weather.

Dry Mortifications in old People without Emphy = = sema, not proceeding from Putrifaction. but rather from Stagnation — The disorder among the Black Cattle has been attended with Emphysematous Symptoms, both externally and internally —

An Abscess from Inflam.n occasioned by obstruction in the Vessels which are then overloaded the parts tumefy and grow harder. Inflam.ns consolidate & unite

unite parts, as the Lungs and the Pleura and if the Inflamma-
tion is not dispersed it suppurates the over distended Vessels be-
ing broken spout out their contents, a Cavity is formed, Matter
is accumulated and is surrounded by the inflamed Parts — The
Reason, why in an Abscess, the Pus does not run from Cell to Cell, if
because Inflammations unite the parts together; first there is a Ge-
latinous Adhesion and then an Anastamosis of the Vessels and
as the Matter dissused itself, the Inflammation goes before hard-
ens and unites the parts and prevents the Matter from going
forward — There was a Case in St. Georges Hospital of a Mor-
tification in which as it advanced up the Legs, was continually
preceeded by an *Emphysema*, at last when it got up to
the Groin the patient died — There was a Case also where the
Scrotum happened to be punctured with a Pin in fastning
on a Poultice a Blood Vessel was open'd and the Blood dissused
itself over the Scrotum & Penis and put on the exact appearance
of a Mortification —

Suppurations

Suppurations. the deep seated for the most part open outwards, there being the least Resistance. that way except when covered with a Strong Fascia — An Ascess opens opens in the middle: or if otherwise the drain is generally depending by reason of its working downwards by its weight dissecting the cellular Membrane and were not Surgeons sometimes too officious it would be better; but Abcesses in the Abdomen, Thorax &c: are exceptions to this for in these Cases they generally find less resistence inwards and Matter always makes its way out where it finds the least Resistence from the Ribs, but often goes inwards and kills the patient — Matter in the Abdomen sometimes works outwards but sometimes acts in the hallow Viscera and gets into the Stomach and Intestines when the Patient is seized with Vomiting and Purging and sometimes dies. Matter rather enlarges the Parts by destending, pressing or breaking them down. Matter is said to be made up of the Juice and Vessels themselves One kind there is certainly where there is no visible distruction

of

of Vessels but a thick matter and nothing like ulcerations
or Solids broken down but from an inflamed Juice or an In=
=flamed Surface: It seems to be owing to a transudation of
the inflamed Part, which tho thin at first, by stagnating be=
=comes thicker and like Pus. In a Child the Intestines
were once laid bare without any ulceration of their Surface
which were gradually covered by a Matter that at first was
thin and transuded. We have the same in an inflammation
of the Eye and in the Clap upon the Glands and this is the
Case with the Aphthæ or Thrush. The Sloughs are of this
kind only and no breach of Parts. Inflamed Surfaces have
a property of giving or squeezing out a thick fluid resem=
=bling Matter. After long Sores when Cicatrised. the Skin
is not so loose or is contracted because the cellular Mem=
=brane is contracted from inflammation. there is a waisting
thereof and also it oftentimes adheres to the Bones.

Of

Of the Fat.

The Nature of the Fat is different in different parts, in gene=
=ral it is divided into Masses, the Partitions are more Membra=
=nous. the Lobes or masses more oily; these are united & Vascular.

The fat is strained off from the Blood by vessels for that purpose and then is loadged in the Cellular Membrane — Boerhaave was of opinion that the quick spreadeng of the Veneral Poison. was by affecting the fat which was in the Cells communicating with one another — It will increase or decrease at a certain Time and on a particular occasion be absorbed.

Doct.r Hunter thinks that in the cellular membrane Substance there is a Glandular apparatus for Secretion absorption and Lodg=ment of the Oil in particular Bladders or Cells which are small and dispersed thro the cellular membrane and from thence the ab=sorbing Vessels are going off and that their little Baggs do not com=municate — This opinion is probable from its analogy to Marrow which

which is made up of a number of Transparent Bodies, like the Roes of a Fish and the Doct.r supposes that the adipose is different from cellular membrane, and that where there is adeps there are appa= ratus for secreting the Oil, and for its absorptions as well as lodg= ment: 1.st because in some parts the membrane is reticular, as in the Eye, Penis, and Scrotum, and if we break a piece of Suet from an Ox when cold, we find it mixed with a retular mem= brane — Also the Oil in a living Human Body is fluid & we observe other fluids change their place by Gravity, but oil does not presure, nor move from cell to cell: it is therefore probable that the oil is confind in Bladders, that have an outlet but the adipose ducts — It has been objected against this that the Oil is too thick to pass from cell to cell, but this will be confuted by injecting melted hogs lard into the Cellular membrane of the Arm, when it is Cold we may press it up and down and therefore most probable it is containd in particular bladders or Cells — Doct.r Haller thinks that the Oil oozes out of the Vessels & is containd in the Cellular membrane in the tracts of the Vessels and

something

something like this we see in the young Epiploon & Mesentry, but Doct.r Hunter, thinks it is not so, for then we should have the greatest quantity near the Vessels.

The Basis of Fat is cellular membrane; the Oil itself is different in different parts in very young animals, as Fœtus's of 4 or 5 Months old no oil is found it being than rather a gelatinous Substance, also when young the Oil is lodged next to the Skin, but as we grow Older it gets more internally and more in the intestines of the parts, hence the Reason why in making preparations, we choose young Subjects, rather than Adults, for Adults dry greatly unless very Dropsical and the Oil in young Children is harder. — The viscera of Children are freer from fit; the anasarcous Dropsy destroys the Fat sooner than any other disease, what was adipose before, becomes very much changed, the principle Use of cellular membrane is to connect parts that they may not be entangled, but have some Motion in one another as the Muscles &c: Cellular membrane is very yielding where the parts require

Considerable

considerable motion, the Bowels that have a very free mo=
=tion have no Cellular membrane — The first Stratum of
Cellular membrane lies nearest the Skin and chiefly cont=
=ains the fat which is taken up when we pinch the Skin, hence
the Reason why Butchers follow the practice to try whether
Cattle are fat or lean — The 2nd Stratum is of a looser kind
and is first filled with Water in a Dropsical habit, there is a
great difference between the outward adispose Stratum and the
internal, the outer is much more fleshy and Substantial.

Doctr Hunter supposes that it contains the
Glandular apparatus of the Arteries to Strain and the Bags to
lodge the fat, tho he wonders he never could distinctly observe this
Apperatus by means of Microscopes, when the fat was forming;
probably from their being dispersed over the Body in so irre=
=gular a manner, but if we examine the cellular membrane
in dropsical patients where the fat is all destroyed we shall
find that the fat which is next the Skin is much denser & more
compact than in other parts.

The

The Cellular membrane is said to fill up the interf=
=tices of parts in order to give the Body a finer figure in some
parts fat serves as a defence against pressure as the Soles of the
feet, Nates, Scrotum &c: — And when we are young the fat is
on the out side of the Body, probably to be a defence against
the Cold, the use of the Animal Oil is to keep the Body warm
for in cold Climates People are fat; in warm lean, and other
Animals are also lean in hot Countries, in Cold Countries they
grow fat against Winter; which may depend much upon their food
— It is of use also to keep an equal degree of Nutrition, as a
Constant supply in wasting the Oil is taken up when there is a
deficiency of food, or fasting, also it is supposed that Oil mixes
with Lymph and makes a Mucilage for lubricating the
Parts but this is much to be doubted, it is also said to sheath
the Parts from irritating fluids but there is no Proof of this.

On

On Bones in General

Animal and Vegetable Substances appear to be compounded of or Organized, where Minerals seem to be rather a Conection, but the hard and soft parts of Animals as well as Vegetables are Vasculer — In the Human Body, bone the hardest and most Solid part is composed of two Substances — 1st The external or hard Ivory like Substance: next a cellular Substance and some add a broad or reticular Substance which is no more than the Spongy become rare — Bones at their first matu=
=rity have Vessels but their fibers are so close as not to be easily trac=
=ed, the bony matters shoots into fibres which are very visible in young=
=er Bones particularly those of the Skull which are then the fibres shoot from the Center to the Circumference, and into these radiated fibres are inserted Transverse ones — The Lamina of young Bones are easily seperated — A Stratum of fibres is said to form a plate being

being compacted with a thicker substance — The most compact and Cellular part differ only in having their fibres shooting in different directions — Glisson thought there existed small processes like nails serving to keep the parts together — The Cells in the Cylindrical Bones have been very accurately examined by some, but their Cells are very irregular as to their shape & disposition, therefore such an examination is rather idle — The reticular Sub= =stance is the hollow of the Bones (called the cavity of the Marrow) is so fine that some say it is destroyd by the common Method of cleansing Bones, from the End towards the middle the reticu= =lar Substance becomes more rare, so that the Compact degenerates into Spungy and that into reticular, there seems to be a small space in the Middle of the Bone without these reticular fibres.

There is no Bone in the Body compact thro' & thro', and the use of those Cavities is first to be a reservoir, for we do not know the use of the Marrow, but perhaps it answers the use of Adeps: The Cavity of the Bone; which contains the Marrow is small at the end but large at the Middle and the end has been said to

Contain

Contain the thinner part of the Marrow and the Middle the thick-
=er, but this does not hold true in the Human Subject, and this
hollow makes the Bone Stronger with the Quantity of Bony Mat=
=ter and the Bone is more secure from breaking, the long fibres
being at a greater distance from the Center of Revolution, it is very
remarkable that the Bones of Birds have very large Cavities where=
=fore they are light, regular and do not require so long a time to be
perfect as if there was more bony Matter. for if that was the Case
it would require very long time to be perfected, for Instance Trees
that have stood a great number of Years are Solid, contain a great
quantity of Matter but their growth is slow. Whereas the annual
Plants are hallow because they must be produced in a Season and
sufficiently strong to resist the Injuries of the Weather, such Plants
as Corn, Wheat, Rye &c.

All bony fibres are Vascular if we except the Animal in
which it cannot be prov,d — The Vessels of the Bones did not appear
so distinctly untill a Method was found out to make them diaphanous
from which they appear Vascular and more so perhaps from the

remaing

remaining membrane of the Marrow — Vessels come first to the outside of the Bones, and from all the Neighbouring Vessels, from one end to the other, be the shape what it will besides these Vessels, especially in the Cylendrical Bones there is a large Artery (with Veins and Nerves attending) branching thro the whole till it gets into the Middle upon the Marrow, then Branches from one end to the other and so from the Inside outwards — If the Inside of the Bone (in a large exfoliation) did not receive Vessels from within a Mortification would Ensue.

The Compact Substance of Bones is said to have no feeling, but it is probable they have Nerves as some filaments may be seen going to some Bones: The Bony matter is most likely deposited in Veins, and so waisted gradually, especially in particular Constitutions and in old Age and some say there are Medullary canals to carry the Marrow within the Compact Substance of the Bone, to prevent it from being brittle, they say the Canal goes a little way Transversly and then Longitudenally and these same going on again Transversly.

It

It was also supposed that from within the pores were grow=
=ing larger, and lesser in going outwards and the Canals larger in
the outside and Gradually lessen inwards where there was a Bed
for the Blood Vessels, and also that the Canal for the blood Vessels
was round, but the Medullary Canal Oval in a transverse Section
— But Doct.r Hunter from examination could not discover
this appearance and as the Blood Vessels come from within
outwards destroys the distention and he thinks this Oval appear=
=ance is caused by the Blood Vessels Branching off to Anastomose.

The Reason from this Theory of Canals that Oil is soaked through,
but as Bones are porous this may happen without these Canals.
Marrow that fills the Cavities of Bones is Analogous to the fat
of the Body, but being either hard or soft, therefore not two kinds
of Marrow — Marrow appears to be a Glistening Oily Vascular
Substance, Its Structure is similar to the Adipose membrane
only less firm; the internal periosteum is said to be a lining
of the Bone by some, and by others the covering of the Marrow,
but this internal perio.steum Doct.r Hunter says he never

saw

vaw and beleves there is none, tho he says he does not know but the Marrow may be contained in little Bags, as we may see in Quadrupeds, but the appearance was that of a fine Membrane supporting Vessels or a more tender adipose Membrane and that these ware absorbent Vessels gradually throwing the Marrow into the Circulation, and keep place with the adipose fat of the Body (there being more marrow in proportion than adipose fat) tho the Hallow of the Bone is never empty, even in the most lean, but the substance is the thinner.

Use of Marrow.

It is imagined that Marrow does no more in Bones than Fat in other Parts of the Body but some say it prevents Bones from being Brittle, but Doct.r Hunter doubts this and thinks Bones are Brittle rather through want of

Earth

Earth and Gluten and not from scarcity of Marrow, the Earthy matter may be taken up into the Constitution and the Gluten too ~ It is said the Marrow transfuse thro the Joints and mixes with the Synovia of the Joints ~ Doct.r Hunter does not believe this as he never saw any upon the Cartilages of Joints when dryed tho he found it to transfuses on every other part of the Body.

Diseases of the Marrow.

The Marrow being vascular is liable to Deseases but they of the kind that arise from Obstruction, which breaks down their Substance being covered with Bone, the Marrow is sup= = ported by the reticular Substance so as not to be displaced by a Shock, when the Disease begins in the Marrow it produces a true Spina Ventosa

The

The Periosteum

With which all Bones are covered is mostly made up of Glistering fibers its outer side is composed of the Spreading of the Tendons and Ligaments on the outside of the Bones or Surface and Naild to it by Blood Vessels, hence the outside is made up of a very different disposition of Fibres, Viz.t the direction being the same with that of the Tendons and Legaments that come to the Bones, this appears plain in the Sternum, the the inner Lamellæ seem to be made up of the same Tendons or Ligamentous Substance without any difference. for with more trouble it may be divided into three Layers. ~ The Periosteum has been Imagined to make a general Covering for the Skeliton but this is not altogether true, for all the Joints the Strong Ligaments and Tendons seem to enter the Bony Substance and the Periosteum is observed to have more Blood Vessels there than the like Substance in any other part which is from Vessels going thro into it to the Bone, and tho it must have nerves yet it is very far from being

Sensible

Sensible as some have imagined — Doctr Haller thinks it not in the least Sensible, the exposed parts of the Teeth are without any periosteum, also the parts of Bones that sub^{t} one another there being peri= =chondrium — Where large Ligaments enter there does not appear to be any Periosteum.

Use of the Periosteum —

1st That it serves as a Medium of Connection be= =tween the soft Parts defending and preserving them from Injury by the hard rough substance of a Bone — It also serves for like purpose will the Blood Vessels which are first fixed to the Periosteum: It also covers the Epyphysis as well as the whole Bone making a firmer union — Doctr Hales experiments on the femur of a Calf prove that 119 ℔ was required to pull off the Epyphysis when without Pe= =riosteum, but 500 ℔ were required when it was on, also hence the

Ligaments

Ligaments and Tendons adhere more firmly to the Bones, it has been thought to limit the growth of Bones, but what limits the periosteum in this Case: for the Bone is firmly covered with it. and this does not happen because the concave sides of Bones are as regular as the Convex — It is also supposed to help on the circulation in the Arteries by its elasticity, but this it does not, for if it did it would prevent the return of the Venal Blood, also the force which the Arteries must use to cause the motion, would be as much as it would gain from the periosteum allowing it to be elastic which it is not.

Diseases of the Periosteum

It suppurates unkindly and forms matter and it Sloughs off. this is of bad Consequence being so near the Bone, when matter is within the Periosteum it should be let out as

soon

soon as possible, for the Periosteum being unyielding the matter runs under it and cause a great part of the Bone to be injured — It seems to be a part that the Veneral Poison more readily affects than some others. it falls upon the Skin, Throat & the Periosteum is principally affected — These Gummy Thickneses are not to be reached by Mercurial Courses sometimes, notwithstanding the rest of the Constitution be clear of the Poison. therefore they should be laid open either by the knife or Caustic (which being done before the Patient enters upon Salivation will by that means be more readily (cured) if this mode be neglected it remains troublesome and after all perhaps it must be open,d and the Bone may then be Carious — It seems to be a Poison that chiefly affects the external parts as the Skin, Head, Face &c: And also the Throat as being exposed to the Air and those parts which are exposed, whence the Periosteum for the same Reason it is on those parts where there is little flesh. Cold is a great Enemy to its Cure, to its cure, and the virus seems to act more powerfully in Cold Countries — Doctr. Hunter supposes

the

the virus is more corrosive and malignant by Cold, in the Spring they do not mind the Pox, they treat it with Diet Drinks &c. — It is common for whole families to have it. — It is worse in Cold Countries not only because Cold exasperates the Virus but also because Mercury cannot be used without Danger.

Processes of Bones

If a process stand out in a roundish Ball its call.d Caput or Head, if the head is flattened it obtains the name of Condyle — A rough unequal protuberance is call=ed Tuberosity — When processes arise narrow and then be=come larger, the narrow part is called the Cervix or Neck — long ridges of Bones are called Spines — Such processes as terminate in a Point are called Coronoid. If the cavities or depressions on the Surfaces of Bones are deep with large

Brims

Brims they are called Cotyloid — If the Cavities are Superficial they are called Glenoid — Long narrow canals are called Sulci or Grooves, small breaches in Bones are call'd Notches — Broad Superficial depressions without brims Sinuosities — Large deep Cavities Fossæ — Large Cavities within the Substance the Bone Sinuses — Holes that pierce quite through the Substance of the Bone Foramina.

Articulation of Bones are of three kinds Viz.ⁿ **Symphysis, Synarthrosis** and **Diarthrosis.** 1.ˢᵗ **Symphysis** is the simple uniting of Bones — It is divided into 3 kinds. 1.ˢᵗ Synchondrosis when a Cartilage is the connecting Substance, as in the Ribs to the Sternum. 2.ⁿᵈ Syneuroses when Ligaments are the Connecting Bodies as in all moveable Articulations — Sysarcosis when Muscles are Streched from one Bone to another as in the Scapula

Synarthrosis expresses the immovable conjunction of Bones, and is divided into 3 kinds 1.ˢᵗ **Suture,** where two Bones are mutally indented, as in the Head. 2.ⁿᵈ Gomphosis

is

is the fixing one Bone into another, as a Nail in a Board, such are the Teeth ~ 3rd Harmonia where one Bone laps over another as the Ossa Temporum over the Ossa Parietalia ~

Diarthrosis is that Articulation that admits of very large motion. 1st Enarthrosis when a large head is Receivd into a deep Cavity as the Osfemoris and Innominat 2nd Arthrodia when a round Head is received into a Superfi=cial Cavity as the Oshumeri and Scapula. 3rd Ginglymus admits of flexion and extension: its of three kinds 1st when a Bone has many processes and Cavities that answer as many Cavities and processes in another Bone as the Tibia and Femur ~ 2nd When a Bone receives another at one end and is re=ceived by the same at the other end ~ 3rd When a Bone receives another & is Received by a third as the oblique processes of the vertebræ.

Surgery

By an Operation in Surgery is ment the Application of the hand or Instrument to any diseased part in order to restore it to health — Its divisions are Syntheses or the uniting of seperated parts together — Diæresis or the dividing of parts natural= =ly united — Exæresis or the taking away any thing inju= =rious to the System as the Stone from the Bladder — Pro the= =sis or the Substituteing an artificial member to that taken from the Body as a wooden Leg &c: — Suture is the uniting of the Lips of a wound generally ment by Sewing — Dry Su= =ture by sticking plaster — Interrupted, when the Stiches are not continued, this is applied to large Wounds — Quill Suture is the same as the other except that two Solid cylin= drical substances about the Length of the wound are applied to the Edges in order to bring the sides of the wound at the

Bottom

Bottom close together — Twisted Suture is when the Thread is drawn from one side to the other in the form of a 8 and is used in the operation for the Hair Lip — Glove Stich Spiral or Continued, the Needle is always introduced on the same side its used in uniting an injured intestine — Encysted Tumors are of three kinds viz.t If the Content of the Tumor resemble curdled milk its called Atheroma — If honey Melicerris. if fat, or a fatty Substance Steatoma.

Mr. Sharp

Of Cartilages Ligaments &c:

Cartilages are compact opake and a little elastic of which there are three kinds Viz.t 1.st Such as supply the place of Bones, as the Nose, Trachea, Arteria &c: These Preserve the

Structure

Structure of the parts and admit of Motion.— 2nd Those that supply the place of Bones before they are formed as in the Fœtus &c: 3rd Such as serve for the Articulation of Bones—

Cartilages differ from Bones in not having Blood-Vessels or fibres to be discovered, tho they are supposed to be Vascular — At the Articulation of Joints they prevent Abrasion by their Smoothness they will not granulate or Exfoliate; ~~by~~ tho they may be corroded—

Ligaments are firm, unelastic, compact Membranous Substances serving to connect the Joints and prevent Luxations — Ligaments, Bones, Cartilages, Tendons, & Dura mater are not mentioned to have (any of them) much Sensibility in a natural State See White & Haller.

The Capsular Ligaments are very Strong and compact, made up of two lamellæ the inner lamellæ being a reflected membrane going over the Head of

of the Joint, covering the Cartilage so coming to Join the ex=
=ternal Lamellæ, which is firmly insested near the Joint — These
Ligaments form a Sac in which is contained a mucilagi=
=nous Liquor, serving to Lubricate the Joints for Motion — These
are Synovial Glands which discharge the Synovia, this is Sub=
=ject to be disordered — 1st By becoming thin and Ichorous
2nd Thick or inspissated &c. It is generally received of late
that the Capsular Ligaments is broken in a Luxation of the
Joint.

There are some Bones we Observe are long as the Os humeri and Femoris,
=thers that are wide as the Scapula, Os innominatum &c — Others irregular as the
Vertebræ — Some are said to be Cylindrical as the Os femoris &c: — But they are not
properly so as they are larger at the ends than the middle: — There are two kinds of eminen=
=ces ob: called Epyphysis, the other Apophysis — The Apophysis is an Original Ossification
or elongation of the Bone — The Epyphysis is an Additional Ossification to a Bone: one
would suppose that the middle part of one of the Cylindrical Bones is weaker than the
ends which is much thicker but is not for the fibres are more closely connected and more Solid
than the ends which are Spungy.

Of

Of the Female Organs of Generation

These are external and Internal — The external are the Mons veneris which is incrimated at a certain age Labiæ or External Lips of the Orifice at the upper part of which is a small Body called Clitoris under which in a small Groove is the Iter ad Urinam thro which the Urine passes and into which the Catheter must be introduced in a Suppression of Urine. And we should be well acquainted with this Orifice, as the Modesty of Women often denies a Sight of this Part, so that we must introduce the Catheter by feeling — At the lower Part where the Labiæ unite is form'd a Fraenum or Fouchette.

The Nymphæ are two Spongy Bodies within the Labiæ, within these in Virgins is a Circular Membrane called Hymen

Hymen and within this is the Ster ad uterum.

Vagina is a Membranous Substance furnished with Rugæ by which the Penis is more Titillated in Coition, there are likewise many small Glands in the Vagina which Secret a Liquor to lubricate the same and during the venereal Orgasm whether real or imaginary there is sometimes so much mucus secreted by these Glands that it has been discharged in such great quantities as to wet all the external parts. — This by some is called the Female Semen — In the Bottom of the Vagina is the Ster ad uterum internum, the Os Uteri or Os Tincæ — Between the Fourchette and Anus there is a Seam called This in difficult labour is sometimes lacerated by the largness of the Fœtus and it is necessary to prevent this Accident by supporting the perinæum with the hand while the Fœtus advances. +

Uterus is a Small Body situate obliquely between the Bladder and Rectum — Its Coats are nearly half an Inch thick and its Cavity very small, the Neck of the Uterus, is full of Rugæ which serve to allow the same to Dilate for the Expulsion of the Fœtus.

The

The Os Tincæ resembles the Mouth of Tench or young Puppy situate at the Bottom of the Vagina tho not a Continuation thereof the Vagina being invested round the Os Tincæ.

From the Fundus Uteri there goes off nearly transversly on each side a Tube called the fallopean Tubes; lying loose and growing larger towards the farther end which is fimbricated — The Uterus is sus=pended by the Ligamenta lata & rotunda.

Ovaria are two Glandular Bodies situate on each side of the Uterus inclosed in a Cellular Membrane in each of the Ovaria are nearly twenty small Ova.

Of Generation

This is performd per Coitu by the Males introducing his Penis into the Vagina & and perhaps into the Os Uteri of the Female (tho this denied by some) at which Time the parts grow

Rigid

Riged by the veneral Orgasm, the Os Tincæ open and receives the Semen in which are Animacules immediately after the Os Tincæ closes — During the Orgasm the fallopean Tubes grow erect and the Fimbriæ seizes the Ovaria at which Time some one or more of the Animacules enters the first ripe Ovum, which has now burst the Cellular Membrane by its Turgidity, then the Ovum is disingaged and carried by the fallopian Tubes into the Uterus and the place where the one Ovum was in the Ovarium is soon after filled up by a Yallow Substance called Corpus Luteum

This I proved by opening a Bitch in the Horns of the Uteries were 7 Whelps 3 in one and 4 in the other and in the Ovaria were the same number of Corpora Lutea

— By a like experiment upon a Bitch opened while the Dog was fastned thereto (for Dogs having no vesiculæ Seminales are obliged to remain fastned for a long Time to the Bitch while the Semen is secreted and carried through the Testicles by the Vasa deferentia into the Uterus)

I

I found that the Semen was ejected immediately into the ute=
=rus — The preceeding Hypothesis seeming incredible and
impossible yet it answers all the Phenomina of generation
the best of any System yet advanced — Upon this Subject
I refer to the Ingenious Spalla zani an Italian —

However the Subject is extremly intricate and no doubt
is one of the Arcana Naturæ which the Omniscient
Jehovah of his infinite goodness sees fit to hide from us.

Of the Fœtus, its Nutrition &c.

The Ovum of the Female, which is Facundated
in the preceeding manner by the Semen Masculinum is
supposed also to contain the Membranes that Envelope the
Fœtus with the Placenta Umbilical Cord &c: The Ovum lies
in

in the uterus 7 Months but for the first two or three Months the Placenta does not adhere to the uterus.

The Chorion is the External Coat of the Foetus and is a thick Spongy Membrane.

The Amnios is within the Chorion is very smooth and thin Between these Membranes some have described called Allantoes which includes the Urine of the Foetus Carried there from the Bladder by the Urachus. This found in some Brutes but cannot be discovered in the Human Species.

The Placenta is made up of a Congeries of Vessels How does it adhere to the Uterus? How is the Foetus nourished? Is it by the umbilical Vein, Mouth, or both together? Does red Blood go immediately from the Uterine Vessels of the Mother thro the Placenta & Vice Versa? From whence comes the Liquor Amnios?

These are Questions that have been difficultly

Solved

Solved by Physiologists Some have imagined that the Pla=
=centa adheared to the Uterus by its Vessels inosculating with
those of the Uterus — Others imagine there is no Continuati=
=on of Vessels by inosculation from the Placenta to the Uterus
but that Placenta adheres thereto by a kind of Cement.
for they say if it Adhered otherwise there must be a laceration
and Consequently an Inflammation and Suppuration which
does not happen when it is brought away.

As to the Nourishment of the Fœtus many have
imagined that it recieved it by the Mouth and bring many
Arguments to prove it. As 1st Navel
String. 2nd A Diminution of the Liquor Amnii. — 3rd
Meconium being found in the Mouth and Stomach and Me=
=conium &c: — On the Contrary others deny that the Fœtus
receives any Nourishment by the Mouth but wholly by the
Umbelical Cord — 1st A want of the Mouth or any passage
into the Chylopoietic Organs. 2nd Corruption of the Liquor
Amnii

Amnios — 3ly That the Liquor Amnio is an excundation from the Foetus and Consequently not fit for nourishment &c: This is the most received opinion but for a particular account of the Nutricion of the Foetus in Utero: Vide Med: Essays Edenb: and Doctr Shippens Thesis for the connec= =tion of the Placenta to the uterus.

It was the received opinion till of late by all who allow'd the Foetus to be nourished by the umbilical Chord that red Blood was immediately conveyd from the Mother to the Foetus — Their Arguments for it were 1st that if the Mother Bleeds to Death the Foetus will be deprived of Blood also — 2dly Injection pass from the Mother to the the Foetus — 3dly That Hemorrhages happen upon a Seperation of the Placenta from the Uterus — 4thly That the Umbilical Chord will Bleed a great Quantity when Cut &c: — But the most Modern Doctrine that now prevails and which answers all the Phenomena but is

that

that Red Blood does not pass immediately from the Mother to the Foetus, for before the Placenta adheres to the Uterus it certainly cannot and then it must be nourished by absorption of the Placentine Vessels as well before as after its adhesion to the Uterus

We have said before that the Placenta does not adhere to the Uterces by inosculation of Vessels but by a slight cementation — We suppose that the small ends of the Placentane Vessels open into the Uterines ones and as the latter are so large near the time of Delivery as to admit of a Goose Quill, whereas those of the former will not admit a Red Globule — It is very probable there are many of the Placentine Vessels that open into those of the uterus.

Part of these small Placentine Vessels is supposed to absorb the Chylous Serous and Nutricious part of the Blood in the Uterine Vessels which the Placenta forms into red Blood before it is conveyed to the Foetus — The manner how the Placenta acts in forming the nutricious Fluid into Blood is unknown but it is supposed to perform the office of the Lungs in that particular — The Placentine Vessels having

absorb,d

absorb,d the nutricious particles of the Mothers Blood it is Convey,d by the umbilical Vein into the Fœtus for its increase and Nourishment; while the superfluous and non nutricious particles are convey,d by the umbilical Arteries into the Placenta and is absorbed by the Uterine and mixed with the Blood of the Mother — These instead of a Reciprocal Circulation between the Mother and the Fœtus which was formerly supposed and is still by some there is only a Secretion of the fluids which pass from one to the other — The Arguments brought to support this new Doctrine are 1st That upon the Mothers Bleeding to Death the Fœtus will not be deprived of its Blood — This Dr Sheppen proved in Edenborough before A: Monro Senr — He bled a Bitch to Death. then open,d her and took out her Whelps, which appeared to have lost not one Drop of their Blood — 2nd That umbilical Cord when cut will Bleed but very little, no more than the Blood Contain,d in the Placenta, this most Mid. Wises know and is mentioned by Smellie — but 3dly and lastly the greatest Argu-

ments

= ments of all is that Injections cannot be made to pass from the Placenta into the Vessels of the Uterus and Vice Versa tho it has been repeated tryed by the greatest Anatomists, Notwithstanding what has been said to the Contrary.

Notes On the Anatomical Parts and Peculiarities of the Fœtus.

The Body is Divided into Head Trunk Superior and Inferior Extremities — There are three Cavities in the Body The first is the upper Cavity or head surrounded and defended by the Cranial Bones 2nd The Middle Cavity or Thoracic Cavity formed by the Ribs Sternum and Vertebræ 3rd The lower Cavity or Abdomen. We find that the Abdomen is not defended by a bony covering as the Thorax is but Covered by the Integuments Flesh and Cellular Membrane

membrane). Those above being removed the first thing we dis=
=cover is a very Considerable covering called Peritoneum which
invests all the contained Viscera — Under the Sternum we find a
Membrane which is called the Mediastinum formed by a duplicature
of the Pleura which seperates the left Side from the right so that the two
Lobes of the Lungs lay seperate from each other in two different Cavities.
In opening the left Side Cavity of the Thorax we discover the Heart a
Muscular Body of a Conical figure contained in a Strong Membrane
called Pericardium.

The Cavity of the Thorax is less in a Fœtus than in a
born Animal Owing to the Lungs never being inflated with the Air —
The Lungs we observe are distinguished into right and left and each
of these into Lobes — The right Lung has commonly three and the
left two Lobes. In the Fœtal State the Lungs are not inflated and are
of a smaller and Compact Substance and will not readily sink in
Water — Great Attention has been given to the Lungs sinking or Swim=
=ming in Water with respect to the Trials for murdering Children
but this is not a general Rule by no means to be followed which

I

I shall endavour to explain in a future Lecture — In the upper Part of the Cavity of the Breast there is a small Gland situate between the two Laminæ of the Mediastinum which is called the Thymus Gland divided into two Lobes abundently larger in the Fœtus than in an Adult — There is a large Canal situate Anteriorly in the Lower part the neck called Trachea arteria from whence it runs down into the Thorax to the Lungs Behind this is situated the Œsophagus which passes down through a Hole made in the Diaphragm and ends in the Cardia or upper Orifice of the Stomach — The Stomach is situated in the epigastric Region not lying transversely but in an oblique direction its upper Orifice receiving the Œsophagus and its lower Orifice or Pylorus going into the Duodenum &c The Thorax is divided by a very broad Muscle from the Abdomen in a Slaunting manner called the Diaphragm which arises from the Sternum before all the Ribs on each Side and from the Vertebra all the way to the Xiphoid Cartilage — It has three considerable Holes one for the Aorta one for the Cava and one for the Œsophagus — The Umbilical Cord in the Fœtus is made up of two

Arteries

Arteries and a Vein which Vein is twice the thickness of the
Arteries joined together surrounded by a pulpy substance and
a Membrane — It resembles a Rope by the contortion and twist-
ing of its Vessels — The two Umbilical Arteries arise from the
internal Iliacs The Umbilical vein goes to the umbilicus of
the Fœtus enters the underpart of the Liver and divides into
two Branches one is a large Trunk called ductus venosus
which goes directly to the vena Cava the other passes through the
substance of the Liver by small ramifications to be mixed with the vena
portarum and terminates at length in vena Cava — from thence we see
the Blood is transmitted to the Heart and from the heart to Aorta by a
communication between them and so the umbilical Arteries return
it back — In the Fœtus the Lungs is not expanded by Respiration —
It therefore denies a passage to the Blood that Way — There is a Contri-
= vance in the Heart Viz.t a hole which is called the Foramen Ovale
which passes immediately from the right Auricle to the Left and a large
Canal called ductus Arteriosus which communicates between
the pulmonary Artery and Aorta which allows the Blood

to

to passs that way without touching at the Lungs and so is returned by the Arteriæ umbelialiæ from the Iliaes and running by the outer side of the Bladder go out at the Navel This is the manner in which the Circulation is carried on in the Fœtal State — The Glandular Substances are all larger except the Testes in proportion in a Fœtus than in an adult — The Liver is Situated in the left Hypochondriae Region and is remarkably larger than in an Adult — We are presented with a view of the kidnies a large glandular Body situated in the lumber Region — Their Capsulæ Succenturiatæ or Re=nales are Remarkably large and are about four Times as large as in an Adult and on that Account are supposed to be of some use in the Fœtus. There is another large Body in the left Hypenchariae Region called the Spleen — Another Re=markable thing in the Fœtus is the Testes which before Birth is situated in the Abdomen but after Birth comes down car=rying along with it a Peritoneal process to form the Tunica Vaginalis propria Testes and passes through

Ligament

Ligament and so descends into the Scrotum After Birth when the Child breaths in the surrounding Atmosphere. the Blood finds a passage very differently Hence the Blood when it returns by the two vena Cavæ enters into the right auricle from thence into the right ventrical, then it circulates thro the pulmonary Artery to the left auricle and left Ventricle and from thence into the Aorta —

The Reason why it should take this Course — I apprehend to be this — After a Child is born it is natural for it to inspire the surrounding Aerial fluid — The lungs must therefore be dilated and the Blood will find a passage that way — after the Blood in circulating through the Heart has got from the right ventri- cle into the pulmonary Artery through the Lungs to the left Auricle — it there makes a Resistance to the Blood passing thro. the foramen ovale and denying its passage that way and when the Blood passes into the Aorta from the left Ventri- cle — it there likewise gives a Resistance to the Blood com- ing from the canalis arteriosus — The passages therefore which were in the Fœtus must be obliterated.

The

The Bones of the Head of the Fœtus are very yielding and are connected only together by a membrane which makes it very convenient in difficult Births by allowing the Bones to Slide over one another, which if it was not for this Contrivance it would be impossible for the Head of the Child to go thro the Pelves — There is on the Top of the Head an opening called the Fontanella which is very necessary to be known when we intend to diminish the Volume of the Head in order to delever the Child for as there is only a Membrane covering the part it must be much more convenient in perforating that part than the hard Bony Substance.

On the Lungs

In describing and explaining the Structure of the Lungs we ought in the first place make mention of the Cavity which

which contains them. — The Thorax is a large Cavity some-
what resembling a Cone Dreaching from the last cervical vertebræ
to the last Dorsal vertebræ — The Bones that form the Thora-
cic Cavity are the twelve vertebra Dorsi behind, the twelve
on each side and the Sternum before, which make a strong
Bony Cavity for the defence of these very important Organs —
The Thorax is concave internally and convex externally, while
the Lungs are convex externally in order to agree with its inter-
nal concave Surface and concave internally where they look
downwards to agree with the convex Surface of the Diaph-
ragm which is a Muscle that divides the Thorax from the
Abdomen.

The upper part of the Trachea Arteria is called
the Larynx which is composed of five Cartilages viz. The
Cricoid, Thyroid, and two arytenoid Cartilages and the Epi-
glottis — The Trachea is continued on from the Larynx and is
situated on the fore part of the Neck and lying upon the Oesopha-
gus, composed of Cartilage, Muscles and Membranes — It
is

is a strong Tube composed of a great number of Cartilaginous Rings connected by Muscular fibres which are incomplete backwards and extend about two thirds round — On the poste= =rior part it is membranous, probably that it may yield to the Aliment distending the Oesophagus in Swallowing —

The Uses of these Cartilaginous Rings are very evedent, to keep the passage continually open for the free admission of Air for if it was made up entirely of Membrane it would sometimes collapse & impede the free passage of the Air in and out which is so necessa= =ry for animal Life.

In the membranous part there are Glands situated which by every pressure the Oesophagus makes against the posterior part of it causes it to flow out. every one of us must be sensible of this very often when we arise in the Morning — It is of great use in keeping the internal Surface of the Trachea moist and defending it from the Acrimony of the Air. as the frequent passing of the Air out and in would cause it to dry — By this Mucus being

Collected

Collected in too great a Quantity in the Trachea it produces the disease called the Hives so fatal in Children in this part.

The Trachea is not made up of one continued piece of Cartilage, but there is a membrane interposed betwixt each, which makes it much more convenient in the bending of the Neck.

After the gets down below the upper part of the Sternum into the Thorax, it there divides into two Branches, one called the right Bronchia going to the right Lobe of the Lungs and the other the Left Bronchia going to the left, where its branches are distributed ad infinitum throughout all the Structure of the Lungs terminating not in sharp points but in membranous Vesicles of a Globular figure. These Branches carry along with them small Cartilaginous Rings in their Ramifications tho they are not disposed into so regular a manner as in the Trachea, sometimes being on the Anterior part and sometimes on the posterior yet they have Cartilage sufficient to keep the passage contenually open.

The Lungs are two large Bodies situated in the Thoracic Cavity and fills it intirely. The

Intercostal

Internal Surface of this Cavity is lined by a membrane called the Pleura — The smooth external Surface of the Lungs is likewise covered by the Pleura which is a Continuation of that which lines the Cavity, when this membrane advances towards the middle of the Thorax it rises up from each of the Lobes and joins the Sternum, thereby forming a partition between the lobes which is Called the Mediastinum. The right Lobe we observe is divided into three distinct Lobes and the left into two large Lobes — The use of their being divided into Lobes is, that if one Lobe should be obstructed it may not hinder the others from performing Respiration — When the Lungs are inflated it covers the Heart, except a place on the Apex about as large as an English Shilling — The Pulmonary Artery arises from the Superior part of the Heart or right Ventricle and proceeds under the Aorta towards the Lungs where it divides into two Branches going to the Right and left Lobes, where it branches out and is distributed all over the Substance of the Lungs, whose small capillary terminations become the Origins of Veins and after these have ramify,d thro the

the whole structure of the Lungs are at length collected into four, five and sometimes six large Veins which terminate in the left Auricle of the Heart — Besides these there is a Bronchal Artery, most frequently arising from the Aorta; which, is distributed thro the Lungs for its entire Nourishment as the Hepatic Artery does in the Liver, as it is known that the pulmonary Vessels do contribute nothing at all to the nourishment of the Lungs, but is rather acted upon by them and made fit for nutrition: These Vessels are connected together by Cellular membrane — Hence we observe the Substance of the Lungs is composed of Air Vessels, Blood Vessels, Lymphatics nerves and Cellular Membrane

The Heart

The Heart is situated in the left Cavity of the Thorax placed Obliquely, so that the Apex inclines to the left

left Side, pointing towards the sixth true Rib and its Basis towards the right Side under the Sternum.

The Pericardium which is a membrane that contains the Heart, is connected above to the large Blood Vessels and its under part to the Diaphragm by Cellular Membrane — It is composed of two Lamellæ and is a reflected membrane, that is to say, after it goes down from the Bases to the Apex is turned Back again without being connected to the Heart — It is much larger than the Heart which Convenience gives the Heart Room for its contraction & Dilation — Its use is to keep the Heart in its proper place and to confine within a watery Vapour in order to lubricate the smooth Surface of the Heart and keep it moist — This Water may be collect-ed in too great a Quantity and thereby occation the disease call'd Hydrops pericardii — It is generally collected in a considerable quantety after the Patient has Labour'd some time under Sickness — A small quantety of this Water is sufficient for the purpose of preserving the Heart moist — After we cut thro' the Pericardium the first thing that presents itself conspicuously

Conspicuously is the left Ventrical — The Heart may be fitly di-
= vided into its Basis, Apese, Anterior and Posterior Sides — It is
convex on the Anterior Side and flat on the posterior which
lies on the Diaphragm.

The Heart has four Cavities, Viz: The two Auricles
and the two Ventricles. — The two Auricles are situated at the
Basis of the Heart on each Side, and may be fitly be called the
Heart itself. — Into the right Auricle we observe the Venæ Cavæ
Ascendens and Descendens open but they do not join immediately as they
enter but rather forming an Obtuse angle with each other — we find the
Venæ Cavæ superior rather determins the Blood into the right Ventricle
and the inferior into the Right Auricle.

There is contrivence At the meeting of the Cavæ is the Tuberculum
Lowerii. — The right ventricle is the wider and shorter of the two and has
a Cavity very different and more irregular than that of the Auricle, have-
= ing fleshy productions in it which is called Chordæ Tendinæ and Carnæ
Columnæ which support the Valves and assist in the contraction of its
Cavity — At the Entrance into the Ventricle at the Auricular orifice

are

are fixed Valves which are said to be three in number called Tri-
cuspidus — When the Blood thro' the Contraction of the
Auricle passes into the right Ventricle it forces these Valves to the
sides of the Ventricle, which Valves close the passage into the Pul-
monary Artery to hinder the Blood from going into it thro' the
weak impulse of the Auricle, before the Ventricle contracts and after
the Ventricle begins to Contract the Blood gets between the Margin
of the Valves and forces them down against the Auricle Orifice and hin-
ders the Blood from regurgitating back again into the Auricle —

The Blood therefore seeking a passage every way finds no
other way than thro the Pulmonary Artery — at the Orifice of this
Artery there are likewise three Valves called Valvulæ semilunares
which hinders the Blood from returning back into the Ventricle —

The Blood then goes thro the Lungs and is at last returned to the
left Auricle by four Veins, which at length passes into the left Ven-
tricle — We observe here the same Contrivence in the left Ventri-
cle as in the right, having Valves at its entrance called mitrales

which

which are two in Number and are of the same use as those of the Right — The right Ventricle is said to be larger than the left But Boerhaave frequently measured them and found no Difference — But the left Ventricle is much thicker and strong- -er than the right because it is required to throw the Blood to the remotest parts of the Body — The Chordæ Tendinæ & Carneæ Columnæ are seen in the left as well as right Ventricle — These fleshy fibres run from the Apex to the Base — The Blood is then thrown from the left Ventricle into the Aorta which is hindered from returning back by the Semilunar Valves which are placed at the Orifice — Just below the Valves arise the Coronary Arteries which go to the Corona and so round its Basis and from thence it is distributed to the Substance of the Heart in order to Nourish it.

The Epigastric Region begins immediately under the Appendix ensiformis at a small superficial depression call'd the pit of the Stomach and in adult Subjects ends above the Navel at a Transverse line supposed to be drawn between the last false Ribs on each side.

This Region is Subdivided into three, Epigastric Region already named: and two lateral Regions term'd Hypochondria. The Epigastrium takes in all that space which lies between the false Ribs of both Sides and the Hypochondria are the places covered by the false Ribs.

The umbilical Region begins in Adults above the Navel at the Transverse line already mentioned, and ends below the Navel at another Transverse line supposed to be drawn parallel to the former, between the two Cristæ of the Ossa Ilium — This Region is likewise divided into three parts, one mid= =dle which is properly the Regio umbilicalis; and two lateral call'd Ilia or the Flanks and they comprehend the space between the false

false Ribs and the upper part of the Os Ilium on each Side.

The Hypogastric Region is extended downward from the inferior limit of the umbilical Region, and is divided into three parts; one middle called Pubis and two lateral called inguina, or the Groins. The lumber region is the posterior part of the Abdomen and comprehends all that space which Reaches from the lowest Ribs on each Side and the last Vertebræ of the back to the Sacrum and Neighbouring parts of the Ossa Ilium. The lateral parts of this Region are termed the Loins, but the middle part has no proper name in Men.

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